LSU College of Science Department of Physics & Astronomy
MARY BIRD PERKINS CANCER CENTER
January 2018
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1. Director's Message

Dear Alumni, Students, Colleagues, and Friends:

We are delighted to report that 2017 was another banner year for the Medical Physics and Health Physics Program. In fact, the education and research programs were so productive last year we did not have time to issue the midyear newsletter. This issue covers the entire calendar year of 2017, so it is a bit larger than usual.

Students are the life blood of our program, which is plain to see in the pages of this newsletter. The perform original research, write scholarly works, and they engage with the local community. Several of our students are even performing portions of their research at leading institutions in Germany and France. We are proud of the accomplishments of our current and former students.

If student are the life blood, then our faculty are the heart of the program. Their dedication to excellence in classroom teaching and research mentoring enables our students to graduate with outstanding qualifications and future prospects. By virtually any measure, our current and former students are doing very well, indeed. The newsletter highlights many of their achievements and successes in 2017.

On behalf of the entire faculty, we thank you for all you do for the program and we look forward to staying in touch with you in 2018.

Sincerely,

Wayne Newhauser, PhD

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2. Trainee Milestones

2.1 Graduations

On Wednesday, June 27th, John Doiron defended his thesis titled, “The Benefit of Intensity Modulated Bolus Electron Conformal Therapy for Post-Mastectomy Chest Wall Irradiation.”

On Wednesday, June 28th, Phillip Wall defended his thesis titled, “Database Plan Quality Impact on Knowledge-based Radiation Therapy Treatment Planning of Prostate Cancer.”

On Monday, December 4th, Paul Maggi defended his dissertation titled, “Development and Applications of a Real-time Magnetic Electron Energy Spectrometer for Use with Medical Linear Accelerators.”

2.2 Certifications

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

Amin Hamideh, MS student (health physics)
Passed part I of the ABHP Exam

Suman Shrestha, MS student (medical physics)
Passed Part I of the ABR Exam

Jingzhu Xu, PhD student (medical physics)
Passed part I of the ABR exam

2.3 Matriculations

The program welcomed 4 outstanding new medical physics students and 3 health physics students, who entered the program in the Fall of 2017.

Payton Bruckmeier, PhD student (medical physics),
BS, Missouri University of Science, 2017

Audrey Copeland, master’s student (medical physics),
BS, University of Texas at Austin, 2017

Anthony Davila, master's student (health physics), BS, Louisiana State University, 2017

Daniel Dimarco, master's student (health physics), BS, Louisiana State University, 2017

Troy Jacobs, master's student (medical physics), BS, Utah Valley University, 2017

Andrew McGuffey, master's student (medical physics), BS, Western Kentucky University, 2017

Garrett Otis, master's student (health physics), BS, Louisiana State University, 2017

Stephanie Wang, master's student (medical physics), BS, College of William and Mary, 2017

2.4 Professional Board Certifications

The MBPCC Medical Physics Residency Consortium submitted its applications for re-accreditation to Commission on the Accreditation of Medical Physics Educational Programs (CAMPEP) in May 2016. A program response and supporting materials were submitted to CAMPEP in January 2017. The reviewers recommended, subsequently approved by the CAMPEP Board of Directors, renewal of accreditation for a 5-year term (through 2021).

The LSU Medical Physics and Health Physics Program also received a 5-year renewal of its accreditation by CAMPEP through 2021.

3. Featured Stories

3.1 A Sit-down with Program Director Dr. Wayne Newhauser

By Cam Sprowls and Hanif Soysal (Medical Physics Students)

Hey, Dr. Newhauser. We just wanted to sit with you and talk about how the Medical and Health Physics programs are doing. Do you have time for a few questions?

Sure, come on in. I'd be happy to help. What would you like to know?

What's new in the program this year?

Well, once again, we brought in an outstanding incoming class of talented students; we're excited to have them here. I delighted, but not at all surprised, to say they are all doing very well. We're also excited by the accomplishments of our faculty and students. For example, the students have been very successful at internal and external competitions. We have seen increasing instances of our students becoming globally engaged. For example, Lydia Wilson has been to Mexico again this year for an outreach program, and she's now at Ludwig Maximillian University in Munich, Germany on an international exchange program, so she's spending six months there working on her PhD research. This is part of a collaboration that we've been developing for a couple of years, and it's fun to see this effort come to fruition. A second student, Erika Kollitz, will be leaving for three years. She'll be doing a big fraction of her PhD research in an international collaboration between LSU and LMU. We've had Chris Schneider spend time this year at the Curie Institute in Paris and at the proton therapy center in Orsay, just outside of Paris, working on his PhD research on radiation therapy. Michelle Lis is at the GSI in Darmstadt, Germany, where she is doing part of her Ph.D. research, in a similar international collaboration. GSI is a world-leader in particle therapy, and it's very exciting that LSU students have these amazing opportunities.

How about here, locally in the program, what's new and what's continuing?

We're also excited about the progress that's happening here locally. The partnership with Mary Bird Perkins Cancer Center continues to thrive. Several students are working on clinically-related research and development projects at Mary Bird. These are leading to the implementation of new technologies, the development of some new, over-the-horizon technologies for commercialization, and other things. Then we're also excited about the new directions of our faculty. Since about 2010, we've had a nearly complete turnover of the academic medical physics faculty and we've recruited several new junior faculty with exciting research directions. We're looking forward to watching these new research programs flourish. Also, it's been a good year for grants. We have been writing, as in previous years, a lot of grant proposals, as academics must these days. Currently we have over $2 million in active grants, including over $1 from the NRC. The increased grant activity has allowed us to reduce our reliance on institutional funding. We're proud of our successes in bringing in resources for students, education, and research.

The majority of students that graduate from the program pursue a clinical career. How successful have they been in the next step of that career?

Placement rate is holding steady at 100%--all of the students who graduate and wish to pursue residency training have been successfully placed at accredited programs. This is a major accomplishment, given that there is about a 50% shortage of training slots. Graduates of our program do very well, and we're proud of their success.

Have you faced any challenges this year? If so, what positive element has resulted from them?

It's been a challenging year in some minor ways. We've had some turnover in the administrative staff that prompted us to look at streamlining many of our administrative processes. We've gone almost completely electronic with our record keeping system. We've also increased our use of automation. As a result, are processes are up to date and are running more smoothly and reliably that before.

What changes have there been made on the academic side?
Last year we had a reaccreditation site visit, after which we received glowing reviews. All of our academic medical physics programs are fully re-accredited for five years. We did get some helpful suggestions and feedback, and as a result of that feedback, were able to make some constructive changes and additions. One of them is the addition of a student organization, which is important to the program because it provides yet another mechanism to work with and communicate with the students and to get feedback on ways to improve the program every year. We completely redeveloped and modernized the MEDP 7995 Seminar course, including, for the first time, a hybrid model where we with tradition, online, and peer to peer instruction. We're also redeveloping and updating our radiation biology course, which will be complete in 2018. Lastly, we are seeing a trend in which more students are applying for and receiving scholarships and travel grants. Overall, the program continued to strengthen and grow in 2017; it was a fantastic year.

3.2 LSU Medical Physicist Kenneth Matthews Named American Association of Physicists in Medicine Fellow

By Mimi Lavalle (via Press Release)

LSU Department of Physics & Astronomy Associate Professor Kenneth "Kip" Matthews II, has been named a Fellow of the American Association of Physicists in Medicine.

A distinct honor among the medical physics profession, an AAPM Fellow honors members who have made significant contributions through service, the advancement of medical physics knowledge based upon independent original research or development, medical physics educational activities, especially in regard to the education and training of medical physicists, medical students, medical residents and allied health personnel, and leadership in the practice of medical physics.

"Please join me in congratulating Dr. Kip Matthews on his election as a Fellow of the American Association of Physicists in Medicine," said Wayne Newhauser, Director of LSU Medical and Health Physics. "It is gratifying and fitting that Dr. Matthews will be recognized in this prestigious way for his many contributions to our program and the medical physics profession."

Matthews earned a B.A. degree in 1990, majoring in chemistry and physics, from Austin College, in Sherman, TX, and his Ph.D. in medical physics from The University of Chicago. From 1997 through July 2001, he served as a clinical and research physicist at Rush-Presbyterian-St. Luke's Medical Center in Chicago. Matthews received his clinical certification in medical nuclear physics from the American Board of Radiology in June 2001, and joined the faculty of the Department of Physics & Astronomy at LSU in August 2001. He currently serves as deputy director for the LSU Medical and Health Physics program, and holds an appointment as adjunct clinical associate professor in Radiology at the LSU Health Sciences Center in New Orleans.

His research principally deals with detector systems for radioisotope imaging, using the gamma-ray emissions of internally-distributed radiopharmaceuticals to visualize in vivo physiology, pathophysiology and metabolic processes. Because of LSU's extensive involvement with radiation therapy physics, he is also involved with medical imaging techniques applied to radiation therapy. Matthews also collaborates on imaging-related projects with LSU faculty in

chemistry, biological engineering, and veterinary medicine. In addition, Matthews has served the LSU Department of Physics & Astronomy since 2010 as the director of its NSF-funded Research Experiences for Undergraduates program.

The mission of the American Association of Physicists in Medicine is to advance thescience, education and professional practice of Medical Physics; a broad-based scientific and professional discipline which encompasses physical principles with applications in biology and medicine. With 8500 members in 93 countries, AAPM supports the Medical Physics community with a focus on advancing patient care through education, improving safety and efficacy of radiation oncology and medical imaging procedures through research, and the maintenance of professional standards.

3.3 Dr. Wayne Newhauser Combats Cancer with 3D Printing Technology

By Chelsea Blanc
225 Magazine, January 25, 2017

https://www.225batonrouge.com/article/dr-wayne-newhauser-combats-cancer-3d-printing-technology

Medical physicist Dr. Wayne Newhauser is combining his expertise with new 3D printing/scanning technologies to minimize treatment-related side effects for cancer patients. The Milwaukee native arrived in Baton Rouge in 2011 to work at Mary Bird Perkins Cancer Center and currently serves as the director of LSU's medical physics program. Aside from his work in cancer research, Wayne has a passion for creating opportunities for up-and-coming scientists and mentoring the workforce of tomorrow.

Wayne is one of the speakers for TEDxLSU, which is coming up on March 11. Wayne took time out from his work to give us more insight to why he does what he does.

What sparked your interest in 3D printing technology for cancer treatment?

I watched a show on Netflix called "Printing the Legend," and it opened my eyes to how transformative 3D printing could ultimately become. When a transformative new technology comes along, we have to try to make use of it. I had no idea what the end result would be, but I had a couple of ideas and hoped one of them would work out. The technology was just too powerful to not try something.

What is your favorite thing about working with up-and-coming researchers in the field?

They're brilliant, they're optimistic, and their lack of experience works in their favor. They don't know that it can't be done. They do things I may have bit my tongue on and not said "this is probably impossible," and sometimes two weeks later they're back with new information about innovative technology that's now available. I benefited

tremendously from opportunities that were created for me, so now what tickles me is creating opportunities for young people.

What do you see for the future of STEM research?

I wish I could say I were wildly optimistic, but realistically, higher education is being defunded. I believe part of this is due to a perception that higher education is for the private good, not the public good. But there's a public good associated with our mission, which is providing the pipeline of specialists who will make the breakthroughs of tomorrow. If we don't correct it soon, it's going to have long-term consequences.

Is there anything we can do to raise awareness about this issue locally?

Absolutely. One thing is focusing on philanthropy, and it's amazing how little money it takes to make a huge difference. If someone is interested in having a large impact both on an individual student and on a workforce that contributes greatly to the health and wellbeing of Louisiana, funding a graduate student scholarship is a great way to do it.

Why do you think it's important to get more women and minorities involved in STEM research?

We need the very best and brightest, and many of them are women and minorities. The number of women in undergraduate physics is comparatively small. However, we're doing extremely well in our medical physics program given that most of the applicant pool is coming from male-predominant disciplines. Right now we're collaborating with Southern University and Xavier to do some recruiting here in the state of Louisiana. It's tough, it's going to take time and effort, but we're still striving to do more.

You are an advocate of public-private partnerships. What role does this structure play in medical physics program?

We couldn't provide the same level of education that we do in the medical physics program without the partnership with Mary Bird Perkins Cancer Center. And MBP couldn't provide the same level of cancer cure to the patients here without the academic program. This is a poster child of sorts of the kind of public-private partnership between university and a private sector enterprise that benefits everyone.

If you weren't a medical physicist, what would you be doing?

Well it was never plan A. I was going to go to technical school to become a machinist, but I decided to go to college very late in my senior year of high school. My dad and brother were both in engineering, so I went to college for nuclear engineering. Then I was almost in the Air Force, but the Gramm-Rudman Balanced Budget Act of 1987 hit so that axed my admission to the Air Force officer training school.

What is one thing you do everyday that might surprise someone?

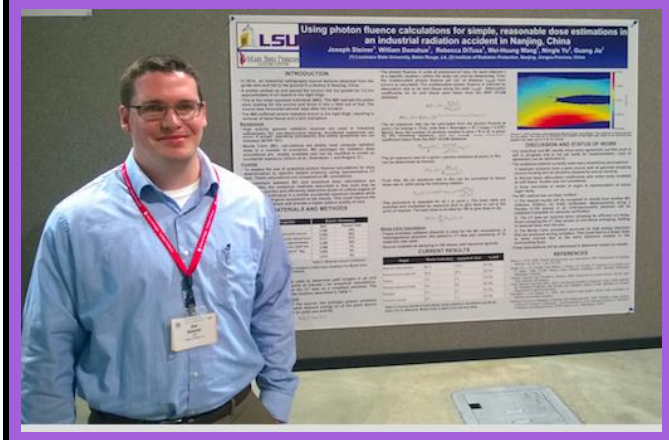
I hate to admit this, but I have a pretty established routine of go to work, work long days, have dinner with the family. There's not really a lot of time for hobbies, but I'd love to pick up biking. I used to race and do long-distance touring. Now that the kids are older and physically capable, we can do that as a family.

If you could switch jobs with another TEDxLSU 2017 speaker, who would it be and why?

I'd like to say Howard Hall, but I don't think I have the right personality to be a comedian. I'll have to say Cynthia Peterson, the dean of LSU College of Science. I find her very impressive: what she does, how she does it, how she thinks. I guess if I were qualified one day, I wouldn't mind switching for a year.

3.4 Volunteer Researcher Joe Steiner, featured in the June 2017 Newsletter of the Health Physics Society

By Penny Leinwander and Joe Steiner



Joe Steiner is a doctoral candidate in the Medical and Health Physics Program at Louisiana State University in Baton Rouge. His doctoral project is in the development of a high-resolution, low-dose prostate tomosynthesis imaging method. He has a strong research interest in both diagnostic imaging and radiation protection. Joe was one of the students involved in the Health Physics Society (HPS) Medical Health Physics Section (MHPS) research project.

How did you become a student volunteer researcher for the MHPS?

One of my fellow students, Andy Halloran, signed up for the HPS Student Support Committee's (SSC) HP Volunteer Program and received an alert asking for student volunteers to help the MHPS research current radiation safety guidance for decedents who had received high activities of sealed and/or unsealed therapeutic radionuclides. Andy was nearing graduation and forwarded the alert to me. I submitted my application, consisting of a résumé and a cover letter, outlining my interest in the program to the SSC. After a few weeks, I received an email that I had been selected as a student volunteer by the project supervisor, Penny Leinwander.

Why did you decide to volunteer for this research project?

While I am working toward a degree in medical physics, I have a very strong interest in health physics. This student research project was a great opportunity to "cross-pollinate" between the two fields. Plus, the research topic was one that I found interesting but didn't really know a great deal about. Patients passing away with elevated and perhaps dangerous levels of activity in their bodies is a rare occurrence, but it is not unheard of. After reading the project needs assessment, I thought, "Wow, that could be a big problem if we don't know what to do when it happens." At that point, I wanted to find out if we did know what to do when it happens, so out of interest and curiosity, I volunteered.

What has been your experience working as a volunteer?

Overall, I would rate this experience as excellent. I was able to learn how many different forms of radionuclide therapy are used in the clinic. The project was very well organized and proceeded according to plan (which was a nice break from the rambling, sprawling mess that is my doctoral project). We published papers on the work that we completed and are in the process of preparing another manuscript. And finally, with the support of the HPS student travel grant, I went to the HPS annual meeting to present on this topic. I thought the 2016 annual meeting was great!

What recommendations do you have for other students who are interested in volunteering?

I recommend that students interested in volunteer research with the HPS do three things:

- Check out the HPS Student Section web page.
- Sign up with the HP Volunteer Program. You simply fill out a survey and a member of the SSC will get in contact with you.
- Apply for HPS student travel grants. This is another very simple application and it is a great way to meet people, some of whom may know about some volunteer work, at the annual HPS meeting. This is also a very good way to get funding to present a poster or talk.

3.5 MBPCC Medical Physicist Connel Chu is the inaugural winner of the Favre Family Award for Innovation

Connel Chu's innovative winning idea is Bilevel Positive Airway Pressure (BPAP) for Radiation Therapy titled "Augmented Ventilation for Reproducible Respiration Evaluation." For patients with cancer in the lung and abdomen, radiation therapy can be complicated by organ motion due to breathing. This research project provides an everyday breathing machine (BPAP) to assist patients with breathing to spare healthy tissue from radiation. This revolutionary thought has never been applied before and can enhance treatment outcomes.

3.6 Dr. Edward Lambremont, Jr., an early leader of the LSU-MBPCC Medical and Health Physics Program passed away in March 2017

Dr. Lambremont was a former director of the LSU Nuclear Science Center until 1998, during which time he worked with Dr. Sheldon Johnson to establish the joint graduate program in medical physics with MBPCC.

3.7 Dr. Joyoni Dey holds an LSU Saturday Science Public Lecture on a "Camera (Gamma Detector) for the Heart."

Single Photon Emission Tomography (SPECT) is a medical imaging modality used primarily to assess heart disease, with about 7 million patients scanned per year in the USA alone. SPECT systems detect gamma-rays emitted from injected radio-tracers, up-taken by the heart. Dr. Dey talked about her invention of a new SPECT system that improves sensitivity three-fold compared to state-of-the-art, lowering dose and time-of-acquisition for Cardiac SPECT.

3.8 Addie Barron, Elizabeth Hilliard, and Lydia Wilson represent the LSU chapter of the American Nuclear Society at LSU outreach LASM Engineering Day

At the annual LASM Engineering Day outreach event held by the Louisiana Arts & Science Museum (LASM), Addie Barron, Elizabeth Hilliard, and Lydia Wilson hosted an interactive booth for kids, introducing them to science and medical physics. They brought brought a box of radioactive household items and a geiger counter and wowed them with salt, plates, rocks, and marbles that all make the geiger counter beep...then let the kids experiment with time, distance, and shielding...seeing how they can change how much it ticks as they get closer and further, by putting different things in between the detector and the item.

3.9 PhD Student Michelle Lis Awarded Prestigious Grant

LSU medical physics PhD student Michelle Lis has recently been awarded the Marie Skłodowska-Curie grant through the European Union's Horizon 2020 research programme for the Optimization of Medical Accelerators (OMA). The objectives of the OMA network are to develop innovative schemes for beam delivery and patient treatment and it is a

collaboration between over 30 universities, research centers, ion beam treatment facilities and industry partners, including Michelle's host institution, GSI Helmholtzzentrum für Schwerionenforschung, located near Darmstadt, Germany. During her stay in Germany, Michelle will continue her enrollment at LSU, but will return periodically to fulfill her degree requirements.

As an OMA Fellow, Michelle will attend several events in the next few years, aimed at developing the skills necessary to be a top researcher in her field. These events include a complementary skills training school, three schools on medical accelerators, on Monte Carlo simulations and on particle therapy, media skills training, and the opportunity to collaborate with other institutions and industry partners. Michelle will be collaborating with CNAO, in Pavia Italy for her project. Additionally, the Fellows will be required to attend conferences and publish papers throughout the fellowship.

Michelle has also been elected to be the OMA Fellows Representative for the OMA Steering Committee (SC). As the representative, she will attend SC meetings and represent the fellows' voice in making decisions on the running of the OMA project and in monitoring the progress of the fellows.

Private Visit to CNAO

LSU Medical Physics student Michelle Lis has recently embarked on her PhD journey at GSI in Darmstadt, Germany. She has joined the Biophysics Motion group there, which does research on developing actively scanning carbon ion treatment delivery systems capable of handling respiratory motion. Her research specifically focuses on developing a robust dose delivery system that is capable of treating moving tumors, such as lung and pancreatic tumors. Her project is motivated by the demand for more accurate methods to treat moving tumors due to low 5 year survival rates for patients with tumors in these sites. One novel method for improving the accuracy of treating moving targets is to develop a dose delivery system that is capable of tracking tumor movement and irradiating it on the fly.

Preliminary research done by the motion group has determined that the current system at GSI is not fast enough for this dose delivery motion. Therefore, to develop this dose delivery system, she is collaborating with the National Centre of Oncological Hadrontherapy (CNAO), in Pavia, Italy. CNAO's current dose delivery system is a suitable starting point for her work, because it was designed with the vision to support future 4D treatments, and can easily be adapted to the treatment delivery system at GSI. As a first step in her project, Michelle has recently gone to CNAO for training on the dose delivery software and related hardware. In addition, she also got a tour of the proton and carbon ion treatment rooms and an overview of the treatment procedures. With this information and the dose delivery code in hand, she can begin navigating the software and developing a strategy for 4D dose delivery.

OMA Complementary Skills Training School and 1st OMA School – Particle Accelerators

Michelle, along with the 14 other OMA fellows met for their first OMA training school in early April, which took place at the University of Liverpool, UK. Over the course of 5 days, the fellows took part in 8 hours of workshops and training sessions focused on building complementary skills needed by early stage researchers and PhD students to have an impact in the scientific world. Topics included project management, presentation skills, scientific writing, peer review, teamwork, and time management.

The training school was taught as a series of workshops, each focusing on one of the topics. In addition to these workshops, the fellows presented their research over video recording and received personal critiques. As a final test, attendees were divided into 3 groups, to design an outreach projects, using the skills on which previous workshops had focused on. In the evenings, Michelle and the other fellows bonded through haunted tours, Go-karting, bar crawling and a formal dinner at the Alma de Cuba.

More recently, Michelle attended the 1st OMA School, hosted by CNAO in Pavia Italy. The school focused on particle accelerator design and therapy applications, where, over the course of 5 days, renowned researchers and industry partners gave lectures on these topics. In addition to the lectures, there were study groups to review the information from these lectures, and a poster presentation session.

The school presented an excellent opportunity to build connections between early stage researchers, such as Michelle, with researchers from other institutions, other early stage research in and outside of the OMA network, and industry partners.

3.10 Baton Rouge Imaging Collaboration Strives to Combat Obesity & Improve Cancer Treatment

Krystal Kirby, a graduate student at LSU and the Mary Bird Perkins Cancer Center's Medical Physics program, and Dr. Owen Carmichael at Pennington Biomedical Research Center work together with collaborators at LSU to “further develop quantum coherence imaging to better delineate the boundaries between brown fat and other soft tissues” to obtain vital information in the battle against obesity, and in the future, against cancer. More information can be found in section 7.2 below.

3.11 Krystal Kirby Awarded Economic Development Assistantship

Krystal Kirby, a third-year PhD student working under Dr. Owen Carmichael, has been awarded an Economic Development Assistantship by the Graduate School of LSU. Krystal is enrolled in the Medical Physics Program in the Department of Physics at LSU and is performing her research at the recently completed Imaging Facility at LSU’s Pennington Biomedical Research Center.

Nearly 78,000 new cases of brain cancer were diagnosed in 2015, with a fatality rate of about 20%. Earlier detection of these tumors would significantly increase the survival rate for these patients because they could receive treatment before the cancer becomes untreatable. Magnetic resonance imaging (MRI) is a safe, widely available, noninvasive

medical procedure that is used to detect cancer elsewhere in the body, but MRI provides relatively poor contrast between tumors and surrounding normal brain tissue, making early detection of small brain tumors difficult.

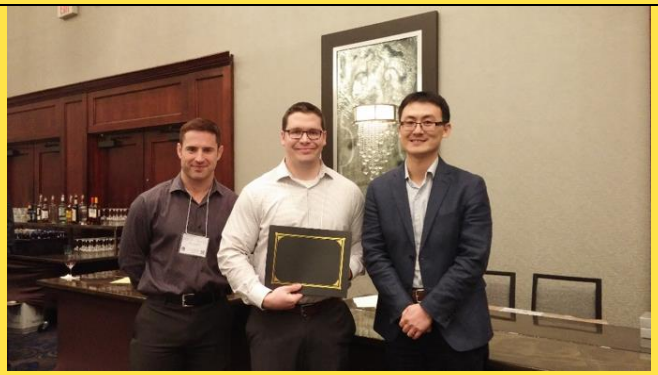
The award will provide support for Ms. Kirby and Dr. Carmichael to study intermolecular multiple quantum coherence (iMQC) MRI. This is an emerging type of MRI that can significantly enhance tumor contrast by exploiting quantum mechanical spin interactions. The goal of her project is to develop iMQC into a clinically feasible technique that is positioned to help radiation oncologists detect brain tumors at an earlier stage than is possible today.

Krystal will work to develop and characterize a new and unique iMQC MRI pulse sequence, then optimize data collection, reduce image artifacts, and minimize image acquisition time to make the pulse sequence clinically acceptable. Most of her time will be spent at Pennington Biomedical Research Center, which boasts two 3T MRI machines suitable for her project. Her hope is to collaboratively develop the technology, secure patents, and license the technology to commercial MRI machine manufacturers, as well as treatment planning systems that utilize MR images for cancer patients.

The LSU medical physics program is run in partnership with Mary Bird Perkins Cancer Center, a private not-for-profit cancer center in Baton Rouge.

3.12 LSU Students Attend SWAAPM

The 2017 meeting of the Southwest Chapter of the American Association of Physicists in Medicine (SWAAPM) was held in Fort Worth TX from March 2-4, 2017. Addie Barron co-organized (along with two students from other regional medical physics graduate programs) the Students & Trainees Professional Development Session. Joe Steiner won 1st prize at the Young Investigators Session for his presentation "A comparison of artifact blur using SAA and FBP in endorectal digital prostate tomosynthesis with simulated phantoms." Elizabeth Hilliard provided photography during the meeting. All of the students helped with working the registration desk at the meeting. Kip Matthews was a meeting co-organizer, and received a plaque for his service as 2016 chapter president.



SWAAPM Award Presentation

LSU Students at SWAAPM

The LSU attendees (graduate students): from left, Krystal Kirby, Joe Steiner, Kip Matthews, Suman Shrestha, Addie Barron, Cam Sprowls, Bethany Broekhoven, and Elizabeth Hilliard.

3.13 Six LSU Students Receive NRC Scholarships in Health Physics

A recent grant from the U.S. Nuclear Regulatory Commission (NRC) has been established at LSU to support undergraduate students to explore careers in the radiation sciences through the field of health physics. LSU's Department of Physics & Astronomy has announced the first recipients of the scholarship program in health physics:

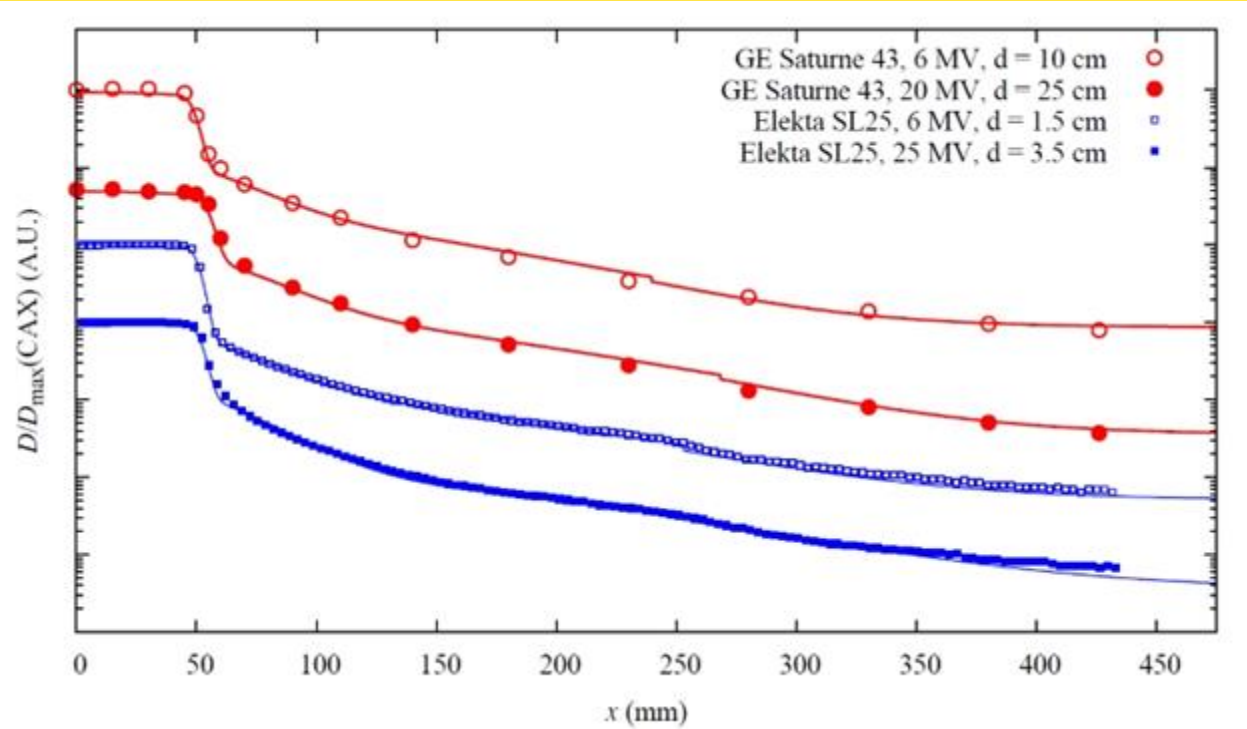
Joshua Campbell, chemical engineering, Daniel DiMarco, physics, Angelle Leger, mechanical engineering, Brandon Luckett, physics, Devin Manning, chemical engineering, and Gregory Martini, chemical engineering

LSU's Medical Physics and Health Physics Program offers scholarships of $5000 each to fund undergraduate students in STEM fields who are interested in exploring careers in the radiation sciences. To be eligible to apply, students must be a full-time student enrolled at LSU A&M or Southern University in Baton Rouge and maintain a 3.0 grade point average.

3.14 Simple Model Predicts Stray Dose

As cancer patients' survival improves, "stray" dose received by the entire body during radiotherapy is of increasing importance. Resulting from scatter and leakage radiation, this dose influences an individual's risk of late effects such as secondary cancer and cardiovascular disease. There is, however, no broadly applicable tool capable of predicting this quantity accurately and efficiently enough for routine clinical use.

To overcome this, an international collaboration is developing a simple analytical model that calculates both therapeutic and stray dose components across a range of photon energies, treatment techniques and systems. Led by Wayne Newhauser of Louisiana State University, the researchers demonstrated an average dose prediction accuracy of 10% against measured dose profiles used to train the model (Med. Phys. doi: 10.1002/mp.12286).



Measured and calculated dose profiles for two linacs

"The model is not meant to replace current therapeutic dose models used in treatment planning," said first author Christopher Schneider, a PhD candidate at Louisiana State University. "But this work suggests that a single analytical model that can be trained using only data that clinics are likely to already have on hand may be capable of providing accurate dose calculations for tissues near to and far from the treatment field."

Advanced modelling

The model is an adaptation of an analytical model previously developed by the researchers that demonstrated accurate dose predictions for 6 MV conformal radiotherapy plans delivered by just one type of linac. It calculates the total dose, summing primary dose, head scatter, patient scatter and head leakage components.

Two versions of the new model were assessed, trained on separate sets of dose profiles previously measured on different linacs at institutes not involved in the study. In each version, the 28 model parameters were fitted to the measured data. The researchers used a gradient search algorithm to identify optimum parameter values that minimized the difference between measured and predicted doses. Comparison of the measured and model-calculated doses demonstrated good agreement, with an average discrepancy of 10% in each version of the model.

They then used the model to calculate dose in an anthropomorphic phantom for a range of treatment systems and techniques, including stereotactic, intensity-modulated and conformal plans. They compared predictions with matching measurements previously reported in the literature.

In this data, the researchers observed good agreement in-field and up to around 15 cm from the field edge. Further off-axis, however, were large discrepancies due to differences in leakage radiation. The researchers attributed these to differences in fluence modulation between the treatment techniques, which is not yet explicitly modelled in the model, and variations in the collimators and head shielding of the different linacs.

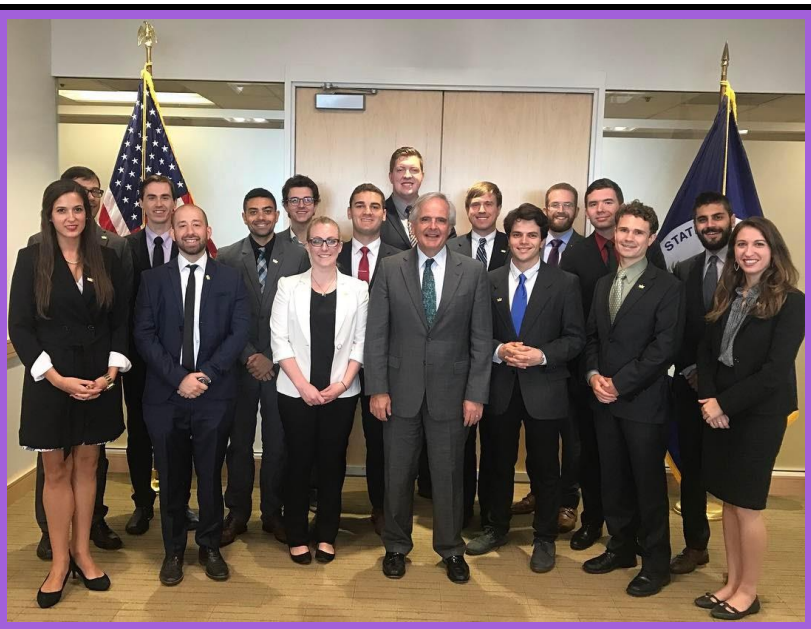
Intended primarily for clinical use, the model's ability to predict and monitor stray dose could be exploited in several aspects of radiotherapy practise, once fully developed. The tool could be used, for example, to design treatments that minimize stray dose and, consequently, the risk of late radiation effects. "It may also be useful in informing physicians of the specific risks of late effects faced by individual patients and the follow up necessary to monitor those risks," said Newhauser. Outside the clinic, the model could improve understanding of the effects of stray dose through epidemiological studies and act as an educational tool.

The collaboration is continuing to develop the model, with clinical implementation still some years away. Current work is focused on investigations of the individual physical factors that dictate stray dose, such as photoneutrons, patient scatter and the effect of beam modifiers. "As we look at finer and finer details, we will have to figure out how to achieve an optimal balance in our quest for realism and accuracy against the need for simplicity and speed," Newhauser told medicalphysicsweb. "There are physical questions, algorithmic questions, and engineering____...???”

3.15 Addie Barron Selected to Participate in the Nuclear Engineering Student Delegation

Sixteen students from across the nation are chosen to participate in the Nuclear Engineering Student Delegation (NESD) in Washington, D.C. Each year, participants formulate a set of policy statements that convey their views on nuclear energy, policy, education, and research. For the remainder of the week, they meet with policymakers on Capitol Hill to deliberate over the subjects they have identified. The goal of the NESD is to provide an opportunity for hands-on experience with the political process so that students may learn how to make a positive impact on the future of nuclear energy.

Addie Barron was selected as one of the 16 participants for the 2017 NESD. She will be representing LSU for the first time since the delegation’s formation in 1994. Traditionally, the NESD has consisted of only nuclear engineering students, but in recent years organizers have expanded involvement to include other professions that utilize nuclear energy. As a representative of the Medical and Health Physics field, Addie will have the opportunity to discuss the policy surrounding nuclear research reactors that produce radioisotopes used for diagnostic nuclear medical imaging, as well as funding for such reactors to meet the demand of increasing nuclear medicine procedures.



Addie Barron (far right) with other NESD delegates meeting with NRC Commissioner, Stephen Burns (sworn in 2014 and appointed by former President Barack Obama) at NRC Headquarters.

3.16 LSU Student Section of the American Nuclear Society (ANS) was Awarded the Certificate of Distinction for the 2016-2017 School Year

American Nuclear Society
Student Sections Committee

presents this

Certificate of Distinction

to the

Louisiana State University

Student Section of the American Nuclear Society
for excellent conduct during the 2016-2017 academic year

Lane Carasik
Student Sections Committee, Chair

October 30, 2017

The Certificate of Distinction was awarded to student sections that demonstrated outstanding dedication to the mission of the ANS.

3.17 LSU Creates Medical and Health Physics Student Group

By Addie Barron

At the beginning of the year, the Medical Physics and Health Physics student body gathered to establish a student group. The group was formed to act as a tool to improve the program by creating an organized outlet for ideas and feedback. The idea for a student group generated from a recent CAMPEP site visit where the overall review of the program was glowing. However, reviewers suggested that the student body should have a representative to directly communicate between faculty and students.

We also used the student group as an opportunity to define the role of the student liaison. The student liaison is a representative to the faculty who fulfills two roles: 1) provide a structured avenue to gather input from students concerning the program, courses, events, etc. and 2) offer a single point of contact for faculty to convey information to the student body.

Since establishing a formal student group, we have gathered approximately twice each semester to discuss various topics. The group has impacted the program by providing edits regarding the trainee handbook as well as feedback for current and future courses. Moving forward, we hope to increase outreach, particularly with prospective students and alumni.

As the acting student liaison, it has been a privilege to serve the program. I have enjoyed opening the line of communication between students and faculty. Overall, I believe the student group has strengthened our program and will continue to do so as we build on the foundation we created this year.

3.18 Lydia Wilson Presents in Munich, Germany

On November 16th, PhD student Lydia Wilson gave a seminar presentation at the Ludwig Maximilians University (LMU) in Munich. The talk was titled "Feasibility of a whole-body-dose treatment planning system" and detailed the progress of her research project, which aims to implement the Newhauser group's analytical models for stray dose from external beam radiotherapy into a treatment planning system. The talk was attended by members of the department of medical physics which includes approximately 50 students, postdocs, researchers, and faculty. The presentation was well received and generated stimulating conversation and enthusiasm for continuing collaborations between LSU and LMU research groups.

Also, on November 16th Lydia gave a talk at the monthly 15x4 Munich event. 15x4 Munich is a science communication project that organizes free educational meetings featuring four popular science talks of fifteen minutes each. The goal of this non-profit organization is to promote science communication and stimulate cross-discipline networking. Lydia's presentation was titled "15 Minutes on Radiotherapy" and aimed to dispel common misconceptions about radiation while highlighting some of the ways in which radiation has become an indispensable tool in modern medicine. The talk

was attended by 100 science enthusiasts of a wide range of ages, ethnicities, and professional backgrounds, and was also live streamed on Facebook.

Lydia was also selected to speak at the DAAD Scholarship Holders' meeting at the Ludwig- Maximilians University (LMU) in Munich during the week of November 29, 2017. She was one of six selected to share her experiences with past and present DAAD grant recipients and donors. The talk was titled "Feasibility of a whole-body-dose treatment planning system."

3.19 Suman Shrestha Awarded HPS Travel Award

Suman Shrestha, a third year Medical Physics graduate student, attended the Health Physics Society Annual Meeting from 9-13 July 2017, in Raleigh, North Carolina. This trip was made possible by “2017 Health Physics Society Travel Award”. Suman believes this opportunity was very helpful in his professional development. It provided him the opportunity to meet researchers and leaders in the field and a means to learn from them. During the trip he also volunteered to help organize the “HPS 5K Run, Rayleigh”. After the meeting he was interviewed, and his views and suggestions were published in student corner of October Newsletter of Health Physics Society. Suman also won the Medical Imaging Book and 15 NCRP reports in the HPS raffle! Congrats, Suman!

3.20 Proton Therapy Physics Workshop at Willis-Knighton Cancer Center

On November 10th and 11th, individuals from LSU and MBPCC attended a proton therapy workshop at Willis-Knighton Cancer in Shreveport, LA. The topics covered and activities included:

- Overview of Proton Beam Therapy

- Proton Site Tour and Patient Treatment Observation
- Clinical Experience of Compact Proton PBS System
- Proton Beam PBS Acceptance Test and Commissioning
- Overview of Clinical Indications
- Proteus One Accelerator and Beam Line/Gantry Design
- Review of Proton Dosimetry Instruments and QA Devices
- TRS-398 Proton Dose Calibration and IROC Credential Application
- Overview of Proton PBS QA
- Proton Therapy Treatment Planning
- Daily, Monthly and Patient QA

3.21 AAPM 2017: A First-Time Attendee's Perspective

By Phillip Wall

It was hard to not feel overwhelmed when looking at the meeting program before this year's Annual AAPM Meeting, especially considering it would be my first time in attendance. But in reflecting on my time in Denver, I realize how the 59th Annual AAPM Meeting enhanced my scientific and professional understanding of our field.

The meeting's theme of "Connecting our Pathways. Unifying our Profession." was particularly evidenced to me through the focus on student and trainee events. Sunday was designated Student and Trainee Day and was filled with an assortment of unique sessions for physicists-in-training. It began with the popular Annual Student Meeting, where we heard from a panel of experienced medical physicists from various backgrounds. They discussed the current state and role of the Doctor of Medical Physics degree, important skills needed to become a successful medical physicist, and how to begin and develop a research career. Following was the joint luncheon and career expo, where we (students and trainees) could enjoy lunch with physicists and representatives to explore potential careers outside the clinic. I participated in a discussion with Dr. Michelle Svantos about the nuances of being a physicist and company CEO, visited with physicists from Standard Imaging about the day-to-day happenings of product managers, and spoke with other like-minded students and trainees about their future interests.

The residency fair was directly after the luncheon, where interested students had the opportunity to interact with faculty and current residents from many programs and learn more about each specific position. This session was valuable because it allowed me to gain a better sense of each program's personality, which is difficult to discern otherwise. This was also a very popular session and seemed to benefit both programs and potential residents alike, especially those planning to participate in the upcoming application cycle.

After the residency fair, I took some time to peruse the poster offerings in the main exhibit halls and survey some of the vendor booths. While merely a graduate student with less than zero spending cache, visiting with vendors gave me insight into vendor-physicist partnerships and a greater appreciation of their important role in helping physicists to improve patient care. Then after eating dinner with some LSU colleagues, I headed to the Great Divide to cap off Student and Trainee Day with the Students and Trainees Night Out. This was a fun event with ping pong, cornhole, craft beer, and a s'more-making station and was held in a large space that was conducive to meeting fellow students and trainees. As with all other events that day, the Night Out was well attended

and enjoyable. I congratulate and thank the Students and Trainees Subcommittee for their work and preparation over the past year in hosting these student and trainee-specific events.

Over the next few days of the conference, I attended various scientific and educational sessions that were of interest including: Machine Learning in Medical Physics, Innovation in Medical Physics Education, Inverse Optimization Meets High Performance Computing, Inverse Planning and Optimization, Research Funding, Economic Issues in Medical Physics, among others. Possibly the most notable and professionally relevant to a young trainee was the New Member Symposium. Hosted by the New Professionals Subcommittee, this session was designed to help new members become familiar with AAPM's governance structure, find service opportunities within the organization, and transition from a trainee to a leader within our profession. The information from this session was incredibly enlightening as AAPM leaders (such as President Melissa Martin and Secretary Todd Pawlicki, among others) revealed the importance of persistence and how one's professionalism can matter as much as research or clinical abilities at times. Further, I plan to incorporate the sentiments of professionalism expressed in this session into my career development as I begin PhD studies this fall.

Overall, I came away from AAPM 2017 in Denver both physically drained and mentally inspired. I was pleased to expand my network of fellow students and physicists and strengthen current connections with my professors and former colleagues. I believe the meeting program perfectly complemented the meeting's theme, especially with the emphasis on new member, student, and trainee events. Being a young student member, I appreciate the job performed by AAPM staff to make the most recent Annual Meeting a rewarding and memorable experience. Thank you!

3.22 Elizabeth Hilliard Advances through LSU's Graduate School 3-Minute Thesis Competition Preliminary Round

On Wednesday, November 29, twenty-five graduate students from across LSU took part in the preliminary round of the Three Minute Thesis (3MT®) competition. Students representing more than 15 departments took on the challenge of presenting their scholarly research in just three minutes or less, with one accompanying slide. Preliminary judges, Dr. Chris Barrett, Dr. Johanna Broussard, and Dr. Billy Saas provided each participant with valuable feedback, and also had the difficult task of narrowing down the talented participants to the top nine finalists.

Elizabeth Hilliard advances to the finals in January 2018 where she will present "Verification and Evaluation of a Passive Intensity Modulation Device for Bolus Electron Conformal Therapy". Good luck Elizabeth!!

3.23 2017 AAPM CE Course "Personalized Electron Beam Therapy Using Custom Treatment Devices"

LSU Professor Emeritus Dr. Kenneth Hogstrom and Mayo Clinic Medical Physicist, Dr. John Antolak continued their support of Continuing Education (CE) at the AAPM annual meeting, presenting a 2-h course entitled "Personalized Electron Beam Therapy Using Custom Treatment Devices." Dr. Antolak lectured on "History of Electron Therapy," "Review of Basic Electron Dosimetry," and "Custom Electron Treatment Devices," the latter covering "Applicator Aperture, Skin Collimation, and Eye Blocks and Eye Shields." Dr. Hogstrom lectured on "Bolus Electron Conformal Therapy (ECT)." The recorded lectures and slides are available in the AAPM Virtual Library at

https://www.aapm.org/education/VL/vl.asp?id=12059 and https://www.aapm.org/education/VL/vl.asp?id=12060 , respectively.

3.24 Future Possibility of Lighter Elekta Electron Applicators

Former LSU graduate student Garrett Pitcher (PhD 2015) completed a study entitled "Design and validation of a prototype collimation system with reduced applicator weights for Elekta electron beams." This study was funded in part by a research agreement between Elekta Limited and Mary Bird Perkins Cancer Center (MBPCC). Earlier this year Pitcher et al published in JACMP "Improved electron collimation system design for Elekta linear accelerators" http://onlinelibrary.wiley.com/doi/10.1002/acm2.12155/epdf , which detailed how to design significantly lighter applicators that produced highly uniform beams with leakage well below IEC standards. This design was verified through measurements for constructed 10x10 and 20x20 cm^2 prototype applicators and Monte Carlo calculations for designed 6x6-25x25 cm^2 prototype applicators, for which a manuscript is currently under review by JACMP. This work and additional technical information has been provided to Elekta should they opt to manufacture lighter electron applicators in the future.

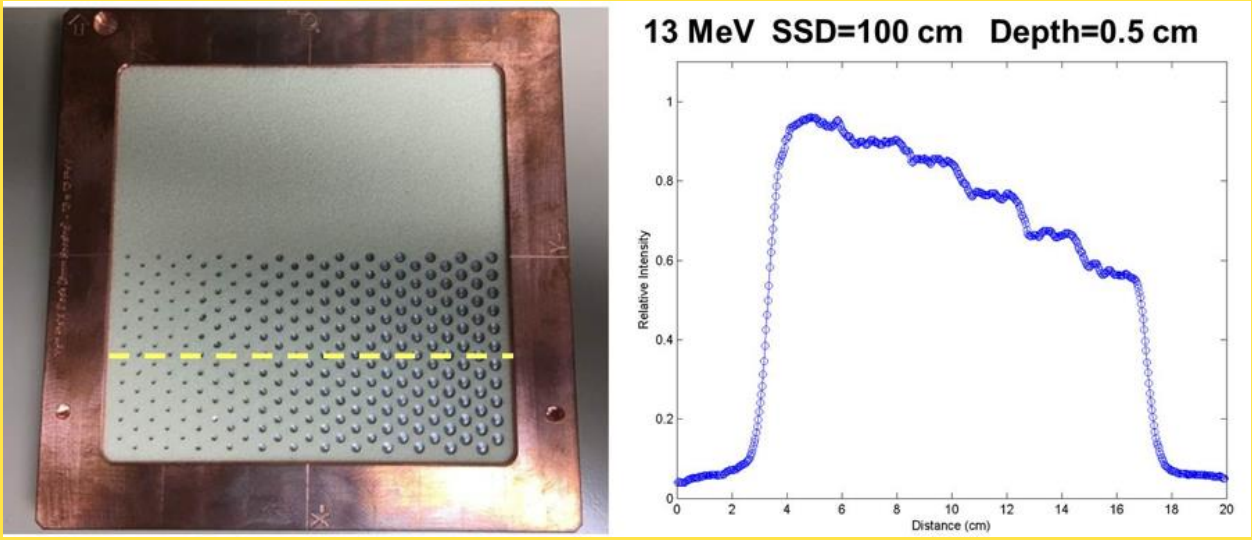
3.25 Forthcoming Enhancements to BolusECT® Software

Medical physicists and LSU graduate students at MBPCC have played an important role in the translation and use of variable thickness bolus from the lab to the clinic. Based on publications by Dr. Hogstrom research groups at MBPCC and prior at The University of Texas M D Anderson Cancer Center, technology for designing and manufacturing variable thickness bolus for electron conformal therapy has become the product BolusECTÒ offered by .decimal LLC (Sanford, FL). Since its 2009 release, over 350 cancer centers have made more than 2,200 custom boluses.

In 2017, John Doiron, mentored by Dr. Robert Carver, completed his MS requirements with his thesis "Benefit of intensity modulated bolus electron conformal therapy for post mastectomy radiation therapy." One major impact of this treatment planning study was its recommendations for enhancements and minor corrections to the existing design software, which will improve efficiency and conformality of current bolus designs. Keep tuned to the .decimal website http://dotdecimal.com/products/electrons/bolusect/ for the next BolusECT® release in its p.d software.

3.26 Passive Electron Intensity Modulators

MBPCC medical physicists Kenneth Hogstrom (LSU professor emeritus) and Dr. Robert Carver (LSU adjunct assistant professor) have invented a low cost, passive technology for delivering intensity modulation with electron beam therapy. Following a provisional patent application, Hogstrom et al (2017) published "Introduction to passive electron intensity modulation" in the Journal of Applied Clinical Medical Physics, and Erin Chambers' thesis "Design of a passive intensity modulation device for bolus electron conformal therapy" became publicly available from LSU libraries. MBPCC research has been funded in part by a joint Small Business Technology Transfer (STTR) grant with .decimal entitled "Product development of intensity modulation for bolus electron conformal therapy" (2016-2018). Current research efforts are focused on graduate student Elizabeth Hilliard's MS thesis project to evaluate patient QA methods for validating patient intensity modulators.



(L) Prototype intensity modulator consists of tungsten island blocks imbedded in foam and placed on a hexagonal grid (0.6 cm spacing) inside half of a 14x14 cm^2 field. Diameters from 0.15-0.40 cm block 94-60% of the local area. (R) Measured dose profile at 13 MeV along dashed line shows stepping of electron intensity following change in block diameter. (for more detail see Hogstrom et al, JACMP 2017)

3.27 Update on Kenneth R. Hogstrom Superior Graduate Student Scholarship in Medical Physics Fund

We are pleased to report significant progress in raising funds for this endowed scholarship fund, whose earnings will soon fund each year, in perpetuity, a MS or PhD graduate student to perform cutting edge physics research benefitting radiation oncology patients.

To date, more than 60 individuals or companies have contributed approximately $255,000. Also, in 2017, we were successful in receiving a LSU Board of Regents grant of $120,000 to match our first three increments of $60,000 contributed, resulting in a total of $375,000 raised to date. We are applying for a LSU BOR matching grant ($40,000) for our fourth $60,000 increment in 2018. Once successful, that will bring the amount raised to $415,000. Additionally, the fund has grown by tens of thousands through LSU Foundation investments. Our final push will be to collect another $45,000, which will qualify us for a fifth incremental BOR matching grant ($40,000), allowing us to reach our goal of a $500-600,000 endowment.

As a Program alumnus, we need your help to attain our goal. If you have not yet given, this is an opportunity to make a gift back to your Program; if you have given, please consider an additional annual gift. Contributions can be made online at www.lsufoundation.org/hogstrom or by contacting director of development for the LSU College of Science Eric Guerin at eguerin@lsufoundation.org or 225-578-7602.

3.28 Joe Steiner Presents at 2nd Global Summit on Precision Diagnosis for Prostate Cancer in Boston, MA

By Joe Steiner

In October 2017, I attended and presented a poster at the 2nd Global Summit on Precision Diagnosis for Prostate Cancer in Boston, MA. This conference is dedicated to improving the diagnosis of prostate cancer, and the primary take-home message was that we need innovative technologies, whether it be imaging, biomarkers, or a mixture of both, that can differentiate between low-risk and/or indolent disease that does not require treatment and high-risk disease that should be treated immediately. This sentiment was echoed by all the physicians and scientists in attendance, many of whom are leaders in prostate cancer care. I found this message to be extremely validating, because it is one thing to read about such a need in the literature as an isolated student and quite another to hear it in-person from people who are giants in the field. Regarding our poster, many people were excited about the implications of our research – that is, they felt that high-resolution tomosynthesis images, if they had sufficient contrast and could identify small tumors, would be valuable to the field. While our work is still in a very pre-clinical stage, their comments have given us purpose to continue refining our technique so that endorectal digital prostate tomosynthesis may one day be used clinically to improve patient care. In summary, I found this conference extremely worthwhile, and I would encourage all students researching a specific topic, whether it be a cancer site, treatment method, or similar, to seek out similar conferences in their field of study.

3.29 LSU Students Thank Dr. Charles M. Smith

From Left to Right (top): Xiaodong Zhao, Yibo Xie, Addie Barron, Joe Steiner, Cameron Sprowls, (bottom): Phillip Wall, Elizabeth Hilliard

LSU Medical Physics students conducting research at Mary Bird Perkins Cancer Center gathered to thank Dr. Charles Smith for his continual support of the program. The Dr. Charles M. Smith Chair of Medical Physics, currently held by Dr. Wayne Newhauser, was created from the generous gift of Dr. Smith. This endowment supports graduate student research and other Program needs.

4. Grants

(**PI in bold**)

LSU-2018-LIFT-001: **Joyoni Dey**. $38,195 .A Novel Far-field Phase Contrast X-ray System. 5/15/2017- 06/30/2017.

Economic Development Assistantship award: **Dr. Owen Carmichael**

Joyoni Dey has set up a collaboration between LSU and UMass Medical School for graduate student Jingzhu Xu to help with iterative reconstruction for Brain SPECT.

LSU-UMMS Collaboration on Brain SPECT: **Joyoni Dey**. $10,000. 11/15/2017- 03/14/2019.

LSU Leveraging Innovation for Technology Transfer (LIFT^2) Grant Award ($39,345). Use: Endorectal digital prostate tomosynthesis for high resolution 3D prostate cancer screening and diagnosis. **Guang Jia**: Primary Investigator (PI), Joe Steiner: Co-PI, Kip Matthews: Co-PI. January 2017-December 2017.

Elekta, Inc. 2016-2018. $146,750. **Jonas Fontenot**. Evaluation of targeting accuracy for stereotactic treatment on the Elekta Versa HD delivery system.

Mobius Medical Systems. 2013-2017. $350,000 + In-kind software. **Jonas Fontenot**. Development of automated quality assurance tools.

Jonas Fontenot has a grant from the Louisiana Hospital Association for the development of software to improve treatment planning.

Rui Zhang has a grant (K22) from the National Institutes of Health for research on cost effectiveness of technology for treating breast cancer

Favre Family Innovation Award. 2017-2018. $15,000. **Connel Chu**. First Augmented Ventilation for Reproducible Respiration Evaluation.

NIH/NCI Phase I Small Business Technology Transfer (STTR) Grant
Title: Product development of intensity modulation for bolus electron conformal therapy
PI: Kevin Erhart (.decimal LLC)
PI (subcontract): **Kenneth Hogstrom** (Mary Bird Perkins Cancer Center)
Duration: 2016-2018, Amount: $261,141

5. Honors and Awards

Dr. Joyoni Dey has procured a research contract of $10K to provide assistance in development work of multi-pinhole Brain SPECT reconstruction at Professor Michael King's laboratory at UMMS, Worcester MA. Dr. Dey and her PhD student Jingzhu Xu will help the UMMS team to develop the research software to incorporate Monte-Carlo based system matrix.

Joe Steiner, Graduate School Association Travel Award, for travel to Second Global Summit on Precision Diagnosis for Prostate Cancer (October, Boston, MA)

Joe Steiner, ANS Travel Award, for travel to the 2017 ANS Utility Working Group (August, Amelia Island, FL)

Joe Steiner, Graduate School Association Travel Award, for travel to AAMP Spring Clinical Meeting (March, New Orleans, LA)

Joe Steiner, Graduate School Dean's Travel Award, for travel to SWAAPM Annual Chapter Meeting (March, Ft. Worth, TX)

Joe Steiner won 1st Place: Highest scoring oral presentation at the 2017 SWAAPM Annual Chapter Meeting Young Investigator Symposium

Phillip Wall, Young Investigator Symposium Finalist, 2017 AAPM Spring Clinical Meeting

Jonas Fontenot, Baton Rouge Business Report 40 under 40 for 2017

Connel Chu, Art Favre Family Innovation Award Winner

Abbie Wood, Art Favre Family Innovation Award Finalist.

William Donahue, AAPM Expanding Horizons Travel Grant Program, the Radiation Research Society SIT Program, the LSU Graduate Student Association, and a Department of Physics and Astronomy Coates Travel Award to attend Radiation Research Society's Annual Meeting in Cancún, Mexico.

LSU Board of Supervisors Fund 13 New Technologies with LIFT2 Grants

Technology that will improve X-rays and medical imaging is one of the 13 innovations the LSU Board of Supervisors recently selected to support through its innovation and technology transfer grant. LSU Department of Physics & Astronomy Assistant Professor Joyoni Dey, along with a PhD student and colleagues at the LSU Center for Advanced Microstructures and Devices, have established the technology to create more detailed X-rays that will aid doctors analyzing lung and bone joint scans. This technology will also provide higher contrast images for mammograms.

Dr. Dey received a LIFT2 grant to work on a novel phase contrast interferometer. The interferometer is an improvement over Talbot- Lau in that it does not require an absorption grating, cutting down dose requirement about a factor of 2. It is also more compact than other far-field systems. PhD student Jingzhu Xu is working on this project and has mathematically built a compact clinical mammography system using Sommerfeld-Rayleigh integrals simulations. This project was well received at an oral presentation at IEEE NSS MIC conference held in Atlanta in October 2017. Further work involves building a small grating structure and performing experiments at the CAMD

interferometer. News coverage can be found at:
http://www.lsu.edu/mediacenter/news/2017/06/16lift2_june2017.php

Dr. Charles M. Smith Named to LSU Alumni Association's Hall of Distinction

http://www.lsu.edu/mediacenter/news/2017/04/18hallofdistinction.eb.php#sthash.edJDHBIb.dpuf

"The LSU Alumni Association annually recognizes alumni who have distinguished themselves and the university through their careers, their personal and civic accomplishments, their volunteer activities and their loyalty to their alma mater," LSU Alumni Association President/CEO Cliff Vannoy said. "These individuals have excelled in all of these areas and exemplify the essence of a true Tiger."

Dr. Charles M. Smith, retired family medicine practitioner, Sulphur, Louisiana, practiced family medicine for 35 years and served as Calcasieu Parish coroner for more than 20 years. Inspired by his personal experiences as cancer survivor and his desire to improve patient care and cancer treatment in Louisiana, he established the Dr. Charles M. Smith Chair of Medical Physics in partnership with Mary Bird Perkins Cancer Center. The academic-clinical partnership, which serves the critical needs of Louisiana, is one of the strongest accredited medical physics programs in the country. Smith serves on the College of Science Development Council and Executive Committee, and he is a charter member of the Dean's Circle. He is a member of the LSU Foundation Laureate Society and LSU 1860 Society and a benefactor of the Methodist Home for Children in Sulphur. He earned a bachelor's degree in biological sciences from LSU in 1951 and a medical degree from LSU Medical School.

Dr. Smith was one of six alumni inducted into the LSU Alumni Association Hall of Distinction this year. Other honorees were Maj. Gen. Glenn H. Curtis, Louisiana adjutant general, and Brandon P. Landry, founder, co-owner and CEO of Walk-On's Bistreaux & Bar, who highlighted the roster of notable alumni inductees on Friday, April 7, 2017.

Also inducted were former U.S. Senator Mary Landrieu, policy adviser with Van Ness Feldman, Washington, D.C.; William Shelby McKenzie, of counsel with Taylor, Porter, Brooks & Phillips, Baton Rouge; and Jake L. Netterville, chairman of the board emeritus of Postlethwaite & Netterville, Baton Rouge.

6. Faculty Appointments and Elected Positions

Dr. Anant Pandey -- Dr. Rui Zhang's new post doc

Dr. Kenneth Matthews -- Scientific Advisory Committee of CAMD

Dr. Abbie Wood -- MBPCC medical physicist Dr. Abbie Wood accepted the role of Associate Director of the medical physics residency program. She fills an important position in the Program that was vacated when Dr. Joe Dugas departed. In her role, she will be an integral member of the program steering committee that is responsible for administrative oversight of our Program, which includes our partners in Shreveport and Jackson. She will also take a more prominent position in the day-to-day operation of the residency program and supervision of the residents.

7. Medical and Health Physics Program in the News

7.1 Executive Spotlight Q&A: Dr. Jonas Fontenot, Mary Bird Perkins-Our Lady of the Lake Cancer Center

Interview of Dr. Fontenot by the Business Report
https://www.businessreport.com/business/executive-spotlight-qa-dr-jonas-fontenot-mary-bird-perkins-lady-lake-cancer-center

Where did your career start, and how did that previous experience prepare you for your current position?
My healthcare career began in the medical physics doctoral program at MD Anderson Cancer Center in Houston, where I was fortunate enough to learn from and work with the leading cancer specialists in the world.

What is one thing about your job people don't expect or know about and hear about?
Cancer therapy is precision medicine and the margin for error is smaller than anyone can imagine. We delivered nearly 50,000 radiation treatments last year, each one highly customized to the individual's disease and anatomy. Once radiation is delivered it can't be taken back, so our entire team has to be on their game at all times. We expend a tremendous amount of resources to ensure safety and quality for our patients.

What drew you to the medical physics field? And, for the uninitiated, what exactly is "medical physics"?
Medical physicists are board-certified clinical scientists that typically work in the oncology or radiology fields. The profession appealed to me because it provided an opportunity to apply my strengths in mathematics, physics, and

problem-solving to the diagnosis and treatment of human disease. After practicing for seven years at Mary Bird Perkins-Our Lady of the Lake Cancer Center, I saw corporate management as an opportunity to expand the ways that I could impact patients' care and experience during their time with us. I also saw it as an opportunity to show that a physicist and scientist can be a successful organizational leader.

What drew you to medical physics? And what attracted you to corporate leadership?
Medical physics afforded me the opportunity to apply my strengths in mathematics, physics and problem-solving to the diagnosis and treatment of human disease. After practicing for seven years at the Cancer Center, I saw corporate management as an opportunity to expand the ways that I could impact patients' care and experience during their time with us. I also saw it as an opportunity to show that a physicist and scientist can be a successful organizational leader.

What are your goals for your company?
Our goal is to be a premier cancer care destination of the Gulf South, ensuring that cancer patients in our community receive compassionate, state-of-the-art care.

What have been some of the unexpected challenges in your position?
The pace at which healthcare economics have changed. It's a perpetual challenge that requires us to continuously re-evaluate our strategic plan so that we can maintain proper investments in technology, facilities and talent.

How have you separated Mary Bird Perkins-Our Lady of the Lake Cancer Center from other competition in the industry?
I have worked very hard to position our team to safely and effectively support the latest technologies as they become available. As a result, our clinical programs utilize a comprehensive collection of state-of-the-art equipment and nationally accredited standards of care that are unrivaled in our state.

You helped bring the Gamma Knife Icon to Mary Bird Perkins-Our Lady of the Lake Cancer Center. How will that device help improve the care given at your center?
The Gamma Knife Icon is the premier brain radiation surgery device in the world. It allows us to treat cancerous or non-cancerous brain conditions while keeping healthy tissue intact. Because the procedure uses radiation instead of a scalpel, treatments are non-invasive, produce very few side effects, and enhance quality of life. Patients go home and resume normal activities the same day of the procedure.

What is your role in the LSU-Mary Bird Perkins Medical Physics partnership?
My role in the program is to teach graduate students preparing for a career in medical physics and to lead research and development projects that improve cancer care for patients in our community and beyond. While I have many corporate leadership responsibilities, I still protect some of my time each week to commit to the program, which is truly unique to the region.

What was it like to care for Mike the Tiger during his cancer treatment? And what kind of disease did he have, exactly?
It was exciting to be a part of Mike VI's care and we were honored to partner with the LSU School of Veterinary Medicine to treat him. Last year, Mike VI was diagnosed with spindle cell carcinoma, a malignant tumor that grows from connective tissues of the bone. The goal with Mike was not curative, but to extend his life and allow him to live comfortably for as long as possible.

You're an adjunct professor at LSU in physics and astronomy. What is your greatest challenge in that role?
Teaching. Our graduate students are enthusiastic, motivated and very smart. Their questions frequently lead to discussions that require me to revisit conventional wisdom and challenge longstanding assumptions about how we deliver care to patients.

If you had to choose one characteristic, what would you say is the most special thing about Mary Bird Perkins-OLOL?
The overwhelming support from our community. Our donors, volunteers and sponsors are the true champions of our mission. Insurance companies reimburse us for clinical services, but it is our community support that enables us to drive the academic, outreach, survivorship and supportive care programs that elevate us from a treatment clinic to a premier cancer care organization.

What is your favorite part about what you do? What makes you excited about going to work?
The best part about what I do is having a role in helping people overcome a life-changing health diagnosis. What inspires me each day is to come to work with a team that is as passionate and committed to our mission as I am.

What is the greatest personal or professional obstacle you've overcome, and how did you overcome it?
Transitioning from my role in science and clinical medicine to corporate leadership. There is a perception that skills in one area are not translatable to the other. However, I have found that my analytical skills have served me well as I have pushed beyond my previous boundaries and into areas of finance, communications and operations.

What professional accomplishment are you most proud of?
I hope that my most significant professional accomplishment is still ahead of me. In the interim, leading the effort that brought a Gamma Knife Icon program to the Cancer Center to benefit brain disease management was a major milestone. There were many, many people involved in the project and I was humbled to serve the team that made this sophisticated technology a reality.

What other leadership roles do you hold in the community and/or what volunteer efforts do you support?
Locally, I recently served on the court for Karnival Krewe de Louisiane, a local organization that has raised more than $3 million to bring education, screenings, support services, innovative treatments and clinical trials to more cancer patients than ever before. Nationally, I serve on the editorial board of a major scientific journal, review applications for the NIH small business innovative research program and am active on two professional economics councils that review and advise Medicare on healthcare policy.

What is a great piece of advice you personally received? Did you have occasion to put it to use?
Don't be afraid to fail. I use it regularly.

What gets your workday off to a good start?
Caffeine always gets my day off to a good start! But, in addition to that, mornings are the time of day that I can spend some time with my kids and talk with my wife. It puts me in a good frame a mind to begin my day.

What do you do to unwind?
Exercising regularly helps to clear my mind. Beyond that, I love food. I became addicted to barbecue during my years in Houston and so I often spend time on weekends trying to perfect my own recipes.

What is an item on your "bucket list"?
I have secret—well, not anymore—aspirations to run for political office. But, until then, we are planning to visit all the U.S. national parks with our kids.

Where is your go-to spot in Baton Rouge during your free time?
Home. Between work, activities with my kids and other obligations I don't get to spend as much time there as I would like, so it's always my go-to spot.

7.2 Baton Rouge Imaging Collaboration Strives to Combat Obesity and Improve Cancer Treatment

https://www.pbrc.edu/news/making-an-impact/?ArticleID=400

In a state with the highest obesity rate in the nation - 36 percent - researchers in Louisiana are pushing to find new and better ways to combat this chronic disease. The battle against such a prevalent health problem is no small task. It requires scientists to uncover countless mysteries which still surround how and why our bodies work the way they do before they can begin to develop targeted therapies aimed at preventing and treating obesity.

One mystery under hot pursuit among chronic disease researchers revolves around brown fat. Unlike the more common white fat, brown fat helps to generate body heat and is thought to be beneficial because of its ability to burn more calories than white fat.

Despite the abundance of brown fat research underway around the world, what remains a mystery is how to get humans to make their white fat burn more calories like brown fat. This is partially because scientists are still learning key details about brown fat - like where it's situated within our bodies.

"Right now, it's hard to tell where brown fat is located within the body and how active it is. We know it can be found around the neck and chest, but we don't know as much about it as we do about the white fat because we haven't been able to see it very well using routine medical tests," said Dr. Owen Carmichael, director of biomedical imaging at LSU's Pennington Biomedical Research Center.

"With a regular MRI, it is difficult to see where the brown fat is or its activity very well," Carmichael said. "PET scanning is currently used to look at brown fat, but it has some limitations, such as limited spatial resolution."

Solving this conundrum requires a team with a great idea. Budding researcher Krystal Kirby is a graduate student in LSU and Mary Bird Perkins Cancer Center's Medical Physics program. Together with Carmichael and her medical physics mentor, Dr. Kenneth Matthews at LSU, she is aiming to develop a new technique that could provide the soft tissue contrast that obesity scientists need to better understand brown fat. The concept for this new MRI technique occurred to Kirby while taking a graduate course on mathematical physics at LSU. Now, Kirby and Carmichael have received funding from LSU in the form of an Economic Development Assistantship award to pursue their idea.

Working together with their collaborators at LSU, Kirby and Carmichael plan to further develop quantum coherence imaging to better delineate the boundaries between brown fat and other soft tissues.

Quantum coherence imaging shows how two atoms interact with one another when they are excited by radio frequency energy. In short, pairs of atoms in different types of tissues interact differently, making the contrast between those tissues quite sharp. Although the imaging process was developed in the 1990s, quantum coherence imaging has not yet been further adapted to detect brown fat in humans.

"Quantum coherence imaging hasn't been used in a clinical setting before because it takes too long, but we are hoping to cut down on the time it takes to utilize this process and to make existing technology better," Kirby said.

Ultimately, quantum coherence imaging could be developed to support people who struggle to lose weight.

"Maybe people who don't do well with weight loss may have fat that burns especially few calories," Carmichael said. "If we can develop new technology to understand brown fat better, we may be able to promote more of the fat to burn more calories, like the brown fat does. This could lead to weight loss, less chronic disease, and longer lives."

A bonus of this collaboration? The same imaging technique under development to battle obesity could also be used one day to help diagnose cancer.

Existing medical imaging techniques can tell us where a tumor is located, but the edges are not always exactly clear, according to Matthews.

"Because the boundaries are unclear, to treat the cancer with radiation you often have to irradiate outside the tumor itself because you want to make sure that you kill all the cancer cells. The downside is that healthy tissue can be impacted in eradicating all of the tumor cells," Matthews said.

After the team develops the quantum coherence imaging technology, they hope to be able to better distinguish which cells on the periphery of a tumor are healthy and which cells are cancerous. One day, this imaging technique could be used in conjunction with CT and PET scans to guide radiation treatment, surgery planning, and treatment assessment.

"Imaging in cancer is currently dominated by radiation techniques such as PET and CT. But here at Pennington Biomedical, we are developing MRI technology that has promise to eventually be integrated into therapy," Carmichael said.

"The smaller the tumor is, the harder it is to position the person for the right image-guided radiotherapy," Kirby said. "But we could use this new technology, along with MRI-guided radiotherapy, to deliver radiation even to the most precise of points in the body while sparing other tissues from excessive radiation."

According to Wayne Newhauser, director of the medical physics program at LSU, this type of collaborative research is only possible in a few places.

"It is hard to top the combined expertise of LSU's science faculty, Pennington Biomedical's researchers, and Mary Bird Perkins' clinician colleagues. This collaborative approach propels our research and education forward in a way that would otherwise be impossible," he said.

For example, Dr. Matthews, an associate professor of medical physics, is Louisiana's only doctorate-level board certified nuclear medicine physicist.

When choosing a graduate program, the collaborative research opportunities available to her in Baton Rouge lured Kirby to Louisiana.

"I applied and was accepted to other top universities within the research triangle in the Northeast for my Ph.D., and I turned them down. I opted to attend LSU's Medical Physics program because its faculty, academics, and facilities are top-notch. In addition, I have the opportunity to work with Dr. Carmichael at Pennington Biomedical, which is world-renowned." Kirby said.

Plus, LSU's partnership with Mary Bird Perkins Cancer Center provides me with hands-on physics training on some of the most cutting-edge equipment in the world - far more than the single semester clinical rotation I might have access to elsewhere."

One example of leading-edge technology is Mary Bird Perkins – Our Lady of the Lake Cancer Center's Gamma Knife Icon, a revolutionary noninvasive radiosurgery treatment for brain tumors. It's the only system of its kind in the Gulf South and provides ultrahigh precision to treat virtually any cancerous or non-cancerous brain tumor as well as central nervous system disorders. As an LSU Medical Physics student, Kirby is able to receive hands-on training with the Gamma Knife Icon and other technologies at the Cancer Center.

Detecting types of fat, how they work, and uncovering the boundaries of cancerous tumors are just the beginning. The technology that Kirby, Carmichael, and Matthews are collaborating on could one day be further developed for use in other chronic conditions.

"The fact that we have these world-class resources in place coming together in Baton Rouge is truly unique," Carmichael said.

The state-of-the-art facilities and resources used for this exploration provide substantial value to citizens of the Greater Baton Rouge area who have access to renowned researchers and technology in their own backyard. Having these resources at their fingertips also helps this team of researchers collaborate to move science forward quicker and more efficiently, ultimately improving quality and length of life for people in Louisiana and around the world.

LSU's Pennington Biomedical Research Center is a nutrition and chronic disease research facility that is putting science to work for a healthier Louisiana, country and global community. Its scientific discoveries have helped change the way America eats, exercises and ages. To participate in research at Pennington Biomedical, visit www.pbrc.edu/healthierLA.

The Medical Physics and Health Physics Program at LSU provides graduate education, training and research in radiation technology with applications in health care as well as in environmental and industrial radiation protection. To learn more about this program contact medphys@phys.lsu.edu.

The Mary Bird Perkins – LSU Medical Physics Partnership provides for a multi-layered joint academic and research program between the two organizations. Created in the 1980's, the partnership leverages the educational and research resources of LSU and the cancer expertise of Mary Bird Perkins to benefit patients receiving cancer care in southeast Louisiana and beyond.

Mary Bird Perkins – Our Lady of the Lake Cancer Center is a regional destination for cancer care which offers the most advanced technology and services provided by a dedicated team of nationally-recognized oncology experts. The Cancer Center provides best-practice, comprehensive care at every stage of the cancer journey, including disease site-specific multidisciplinary care teams, a robust clinical research program, extensive supportive care services and is the only facility in the Gulf South with the revolutionary Leksell Gamma Knife®Icon™. As a nonprofit organization, donor

generosity is essential to sustaining the mission of improving survivorship and lessening the burden of cancer for so many throughout Southeast Louisiana and beyond. For more information on the Cancer Center, and how you can become involved, please visit www.marybirdlake.org.

7.3 Oak Ridge Duo Replicates 1976 'Atomic Man' Incident

By Brittany Crocker

http://www.knoxnews.com/story/news/2017/08/14/scientists-replicate-1976-atomic-man-incident-oak-ridge/536308001/

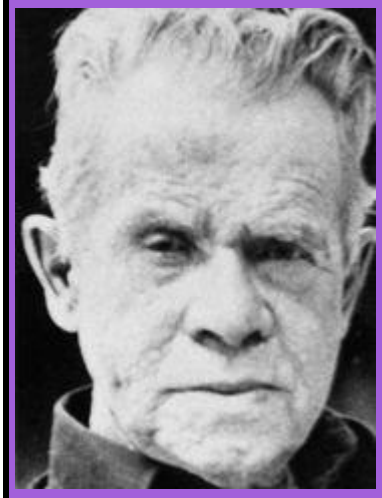
A postgraduate student intern and an Oak Ridge Associated Universities researcher teamed up to replicate the 1976 McCluskey Room Incident, in which a chemical worker now known as "the Atomic Man," survived the highest known exposure to the radioactive isotope Americium-241 at Hanford Plutonium Finishing Plant in Washington.

The pair are trying to measure the physiological effects of chronic low-dose radiation and establish new data for first responders and clinicians to reference after a radiation incident.

The incident

Haorld McCluskey, "the Atomic Man," told People Magazine in 1984 that he had just celebrated his 40th wedding anniversary with his wife the night he returned to work. The laboratory he worked in had been closed for five months because of a strike.

At the lab, his supervisor instructed him to add nitric acid to columns containing the radioactive isoptope Amercium-241, though the columns were reportedly coated in resins that had been left unattended for months.



When the nitric acid and the resins mixed, the column exploded, showering McCluskey with acid and radioactive material. In that moment he received 500 times the amount of radiation considered safe for a person to endure in a lifespan.

Local media accounts of the August 1976 incident describe McCluskey, blinded and unable to hear well, being remotely evacuated from the laboratory to a concrete isolation tank where he stayed for the next five months.

McCluskey literally exhaled radiation. The Department of Energy told Southeast Washington's Tri-City Herald that McCluskey's body set off Geiger counters as far as 50 feet away.

McCluskey went through intense chelating treatments to reduce the amount of radiation in his body.

He was eventually able to go home to his family. He died at 75 of a heart condition unrelated to the incident, to the bafflement of doctors at the time.

The experiment

ORAU health physicist Jason Davis is working with Daniel DiMarco, a summer intern he is mentoring through ORAU's new visiting faculty research program to safely replicate the incident.

The pilot program creates teams to tackle research projects that benefit the organization's work in fields like health physics.

"Reading about the atomic man incident, I read where they had made really good estimates of the total dose delivered to the body, but when they went to analyze the lymphocytes in the body they weren't able to calculate a direct-dose response," Davis said.

"Dose response" refers to how the body acts when it is exposed to a certain amount of radiation over time, versus being exposed all at once. Davis and DiMarco want to examine the body's response to radiation exposure over different lengths of time.

“From a purely scientific perspective, we don’t know a lot about chronic low-dose radiation,” said DiMarco, who is getting his master's degree at Louisiana State University. “We know much more about what happens from accidents. We need a bigger data set.”

Obviously, Davis couldn't directly expose himself or his intern to the radiation in the same way that McCluskey was exposed to it.

So, the two designed an experiment using a cobalt isotope in a sealed source and used donated vials of their own blood, rather than themselves.

"The nifty thing about radiation dose in the body is that your body doesn't care where it came from," Davis said. "The dose is just the amount of energy deposited in a given mass, so it doesn't matter if it came from a different isotope or even from a medical X-Ray. It's the total quantity you're exposed to that matters."

They irradiated their blood for different lengths of time, mixed it with a culture and put it in an incubator. Then, ORAU researchers added a drug that freezes cells going through mitosis to halt the cells in metaphase: the phase in which chromosomes line up before they split apart.

By examining the chromosomes in metaphase, scientists can see the centromeres that chromosome spindles attach themselves to.

Davis and DiMarco are looking for dicentric chromosomes: ones that have two centromeres. Chromosomes can become dicentric when they are exposed to radiation.

Davis said most people have a few in their body already. "But, when more are visible it's an indication that you've seen some type of radiation exposure above background," he said.

The student-mentor team harvested the irradiated blood cells and examined them in a microscope.

The goals

The donated blood experiment does have its drawbacks, however.

Lymphocytes, a kind of small white blood cell, are constantly dying and repopulating. An irradiated lymphocyte in a blood sample could die off and be replaced by a new one before scientists have time to measure it.

Davis said he hopes that in the future they can perform the experiment on a mouse or a rat to get more accurate results. Irradiating an animal's body creates a disposal hazard though, so getting that kind of study approved would be difficult.

"You'd be trying to dispose of a material that is both radioactive and a potential biohazard so it's a mixed waste and it gets difficult there."

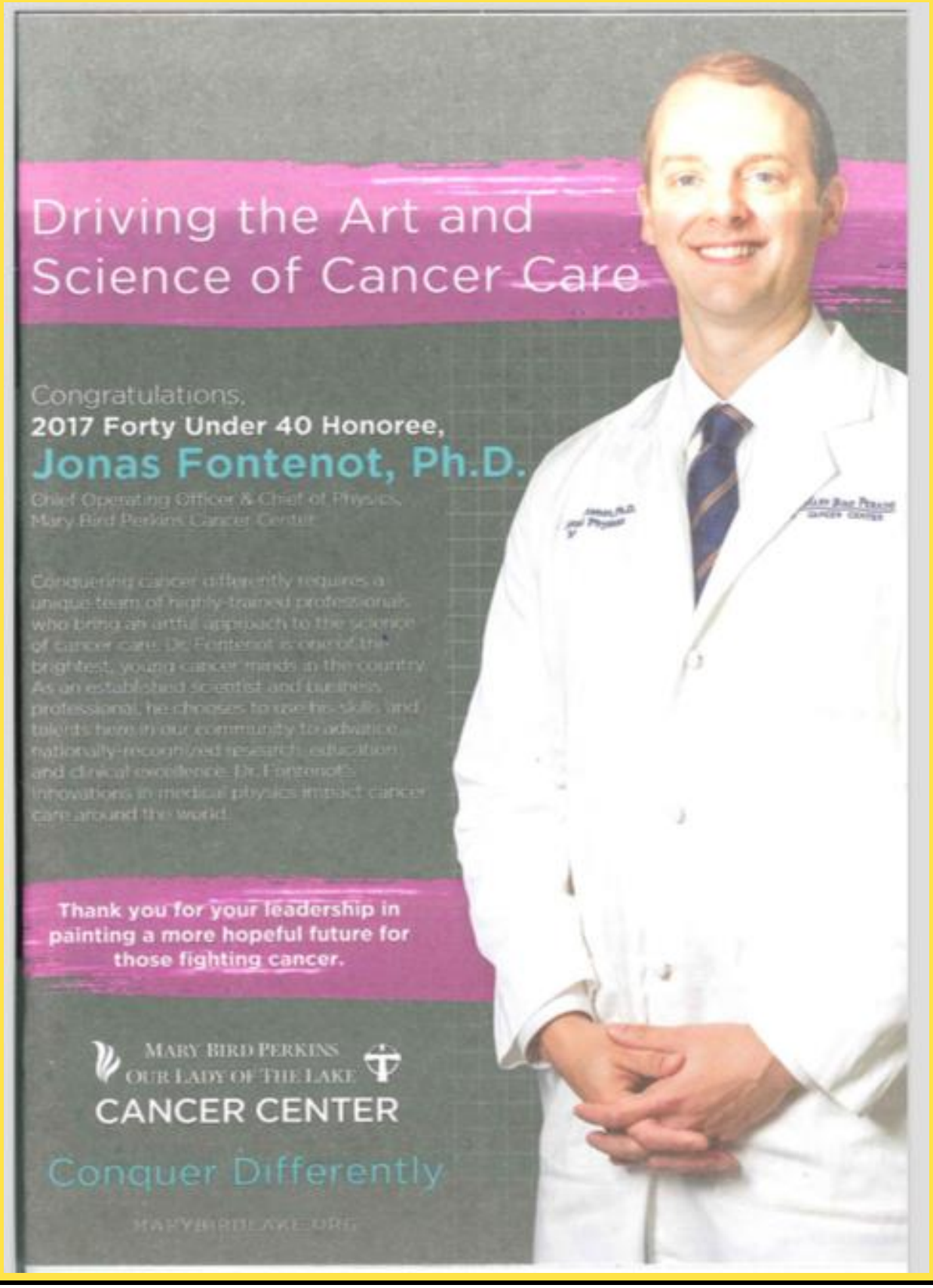
Either way, Davis said the goal is the same. They want to continue the research with greater and greater exposure times and doses to establish data that can better prepare clincians for what might happen over time to the body of a patient from a radioactive incident.

"In and ideal case, like that of the atomic man, they administered a chelating agent that grabbed a lot of the Americium (isotope) and just cleaned it out of his body," he said.

"It worked very well, but having the type of information Daniel and I are developing would give the clinicians a better idea of how much of the agent they need to administer and when and if the agent is going to impact other measurements on down the line."

7.4 Dr. Jonas Fontenot is Featured as the 2017 Forty Under 40 Honoree in November's Business Report

Congratulations Dr. Fontenot!


Driving the Art and Science of Cancer Care
Congratulations,
2017 Forty Under 40 Honoree,
Jonas Fontenot, Ph.D.
Chief Operating Officer & Chief of Physics,
Mary Bird Perkins Cancer Center
Conquering cancer differently requires a unique team of highly-trained professionals who bring an artful approach to the science of cancer care. Dr. Fontenot is one of the brightest, young cancer minds in the country. As an established scientist and business professional, he chooses to use his skills and talents here in our community to advance nationally-recognized research, education and clinical excellence. Dr. Fontenot's innovations in medical physics impact cancer care around the world.
Thank you for your leadership in painting a more hopeful future for those fighting cancer.
MARY BIRD PERKINS
OUR LADY OF THE LAKE
CANCER CENTER
Conquer Differently

8. Selected Publications

Journal Articles:

A. Wood, S. M. Shea, M. Medved, G.S. Karczmar, M. Surucu, S. Gros, W. Small, J. Roeske, “Spectral Characterization of Tissues in High Spectral and Spatial Resolution MR Images: Implications for a Classification-Based Synthetic CT Algorithm,” Med Phys, accepted & in press.

M. Harkenrider, S. Shea, A. Wood, J. Yacoub, J. Ryva, A. Goldberg, R. Potkul, M. Liotta, W. Small Jr, “How one institution overcame the challenges to start and MRI-based brachytherapy program for cervical cancer,” J Contemp Brachytherapy, accepted & in press.

I. Hidrovo, J. Dey, M. E. Chesal, D. Shumilov, N. Bhusal and J. M. Mathis, "Experimental Method and Statistical Analysis to Fit Tumor Growth Model Using SPECT/CT Imaging: A Preclinical Study", Quant Imaging in Med and Surg, vol. 7, no. 3, pp. 299-309, June 2017

Schneider, C. W., Newhauser, W. D., Wilson, L. J., Schneider, U., Kaderka, R., MiLWanić, S., Knežević, Ž., Stolarcyzk, L., Durante, M. and Harrison, R. M. (), “A descriptive and broadly applicable model of therapeutic and stray absorbed dose from 6 MV to 25 MV photon beams” Med. Phys.. Accepted Author Manuscript. doi:10.1002/mp.12286

Phillip DH Wall, Robert L Carver, and Jonas D Fontenot. “An improved distance-to-dose correlation for predicting bladder and rectum dose-volumes in knowledge-based VMAT planning for prostate cancer”. *Physics in Medicine and Biology*, Accepted; Nov, 2017.

Phillip Wall. AAPM 2017: A First-Time Attendee’s Perspective. AAPM Newsletter, 42(5), Sept/Oct 2017.

Amy Berrington de Gonzalez, Bhadrasian Vikram, Jeffrey C. Buchsbaum, Florent de Vathaire, Wolfgang Dörr, Daphne Hass-Kogan, Johannes A. Langendijk, Anita Mahajan, Wayne Newhauser, Andrea Ottolenghi, Cecile Ronckers, Reinhard Schulte, Linda Walsh, Torunn I. Yock, Ruth A. Kleinerman, “A Clarion Call for Large-Scale Collaborative Studies of Pediatric Proton Therapy”, International Journal of Radiation Oncology*Biology*Physics, Volume 98, Issue 5, 1 August 2017, Pages 980-981, ISSN 0360-3016, https://doi.org/10.1016/j.ijrobp.2017.03.033.

Camilla Hanquist Stokkevåg, Uwe Schneider, Ludvig Paul Muren, Wayne Newhauser, “Radiation-induced cancer risk predictions in proton and heavy ion radiotherapy”, Physica Medica, 2017, ISSN 1120-1797, http://dx.doi.org/10.1016/j.ejmp.2017.04.022. (http://www.sciencedirect.com/science/article/pii/S1120179717301096)

Mazza, A., Newhauser, W., Pittman, S., Halloran, A., Maggi, P., Tran, L., … Ziegler, J. (2017). “Cell-shaped silicon-on-insulator microdosimeters: characterization and response to 239PuBe irradiations”. Australasian Physical & Engineering Sciences in Medicine, 1–7. https://doi.org/10.1007/s13246-017-0576-9

Petersen N, Perrin D, Newhauser W, Zhang R. “Impact of multileaf collimator configuration parameters on the dosimetric accuracy of 6-MV Intensity-Modulated radiation therapy treatment plans”. J Med Phys 2017;42:151-5

Newhauser W.D., Schneider C., Wilson L., Shreshtha S., Donahue W. (2017) “A Review of Analytical Models of Stray Radiation Exposures from Photon- and Proton-Beam Radiotherapies”, Radiation Protection Dosimetry, https://doi.org/10.1093/rpd/ncx245 [Epub ahead of print]

E.E. Klein, J.D. Fontenot, N. Dogan, "The ever-evolving role of the academic clinical physicist," Int J Radiat Oncol Biol Phys 98(1): 18-20 (2017).

W.D. Newhauser, "The medical physics workforce," Health Phys. 112(2):139-48 (2017).

K. Smith, P. Balter, J. Duhon, G. White, D. Vassy, R. Miller, C. Serago, and L. Fairobent, "AAPM Medical Physics Practice Guideline 8.a.: Linear accelerator performance tests," J App Clin Med Phys 18(4): 23-39 (2017).

Chapman J.W., Knutson N.C., Fontenot J.D., Newhauser W.D., and Hogstrom K.R., Evaluating the accuracy of a three-term pencil beam algorithm in heterogeneous media. Physics in Medicine and Biology 62(3):1172-1191, 2017.

Pitcher G.M., Hogstrom K.R., and Carver R.L., Improved electron collimation system design for Elekta linear accelerators. Journal of Applied Clinical Medical Physics 18(5):259-270, 2017.

Hogstrom K.R., Carver R.L., Chamber E.L., and Erhart K., Introduction to passive electron intensity modulation. Journal of Applied Clinical Medical Physics 18(6):10-19, 2017.

Abstracts:

Schneider, C.W., Newhauser, W.D., & Farah, J. Analytical Models of Stray Radiation for External Beam Radiotherapy. EURADOS Annual Meeting. Karlsruhe, Germany. February 28, 2017

D Schofield, P Johnson, L Fong de los Santos, W Newhauser, D Gress. TG275 and Radiation Professional Workforces. Presented at:AAPM Spring Clinical Meeting; March 19, 2017; New Orleans, LA.

Newhauser, W.D., Schneider, C., Wilson, L., Shrestha, S., Lis, M., and Donahue, W. Modeling of risk of secondary cancers from radiation therapy. Presented at the 13th NEUDOS Symposium; May 14-19, 2017; Krakow, Poland.

Steiner J, Matthews K, Jia G. Determination of LDRBT prostate seed location using an endorectal detector. AAPM Spring Clinical Meeting Young Investigators Symposium, New Orleans, LA, March 2017. Oral presentation

Steiner J, Matthews K, Jia G. A comparison of artifact blur using SAA and FBP in a simulated phantom. SWAAPM Annual Chapter Meeting Young Investigators Symposium, Ft. Worth, TX, March 2017. Oral presentation.

Steiner J, High resolution prostate imaging with an endorectal x-ray sensor. 2017 Second Global Summit on Precision Diagnosis for Prostate Cancer, Boston, MA. October 2017. Poster Presentation.

Phillip DH Wall, Robert L Carver, and Jonas D Fontenot. An improved distance-to-dose correlation for predicting bladder and rectum dose-volumes in knowledge-based VMAT planning for prostate cancer. AAPM Spring Clinical Meeting, 2017.

Phillip DH Wall, Robert L Carver, and Jonas D Fontenot. Improved knowledge-based bladder and rectum dose-volume predictions using a database of Pareto optimal plans in VMAT planning for prostate cancer. AAPM Annual Meeting, 2017.

Donahue, W., & Newhauser, W. D. Towards a Multiscale Model of Vascular Dose for the Whole Brain. Poster Presented at: AAPM Annual Meeting; July 30th – Aug. 3rd 2017; Denver, CO. and Radiation Research Society Annual Meeting; October 13th – 18th 2017; Cancun, QR, Mexico.

Taddei, Phillip; Khater, Nabil; Youssef, Bassem; Howell, Rebecca; Jalbout, Wassim; Zhang, Rui; Geara, Fady; Giebeler, Annelise; Mahajan, Anita; Mirkovic, Dragan; Newhauser, Wayne "Low- and middle-income countries can reduce risks of subsequent neoplasms by referring pediatric craniospinal cases to centralized proton treatment centers". Biomedical Physics & Engineering Express. Accepted December 13, 2017.

HPS June 2017 Newsletter:

(Cover) -- Health Physic Students Contribute to Research: Summary of Health Physics Journal Article 'Using the Health Physics Student Volunteer Program for a Research Project Sponsored by the Medical Section of the Health Physics Society'" by Penny Leinwander and Joe Steiner

9. Seminars and Presentations

On February 23, 2017, the Deep South Chapter of the Health Physics Society hosted guest speaker Eric W. Abelquist, PhD, Executive Vice President, Oak Ridge Associated Universities with a seminar titled “Thoughts on radiation safety programs if the LNT hypothesis is abandoned.”

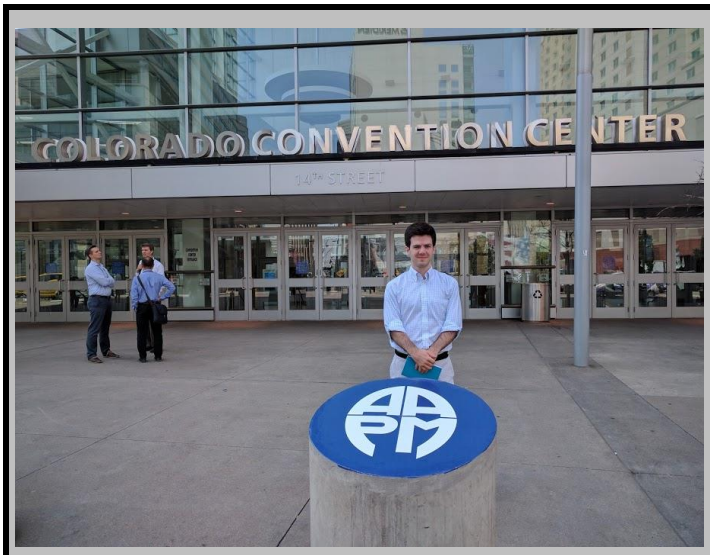
Schneider, C.W., Newhauser, W.D., & Farah, J. Analytical Models of Stray Radiation for External Beam Radiotherapy. EURADOS Annual Meeting. Karlsruhe, Germany. February 28, 2017

Steiner J, Matthews K, Jia G. High-resolution prostate imaging with an endorectal x-ray sensor. The Second Global Summit on Precision Diagnosis for Prostate Cancer, AdMeTech Foundation, Boston, MA, October 2017. Poster

Steiner J, Matthews K, Jia G. Determination of LDRBT prostate seed location using an endorectal detector. AAPM Spring Clinical Meeting Young Investigators Symposium, New Orleans, LA, March 2017. Oral presentation

Steiner J, Matthews K, Jia G. A comparison of artifact blur using SAA and FBP in a simulated phantom. SWAAPM Annual Chapter Meeting Young Investigators Symposium, Ft. Worth, TX, March 2017. Oral presentation. An ePoster was also presented at the AAPM annual meeting in Denver, CO

Wall P. Improved Knowledge-Based Bladder and Rectum Dose-Volume Predictions Using a Database of Pareto Optimal Plans in VMAT Planning for Prostate Cancer. Oral Presentation, AAPM Annual Meeting; Denver, CO, Aug. 3, 2017.



Wall P. An Improved Distance-To-Dose Correlation for Predicting Bladder and Rectum Dose-Volumes in Knowledge-Based VMAT Planning for Prostate Cancer. Young Investigator Symposium, AAPM Spring Clinical Meeting; New Orleans, LA, Mar. 18, 2017. **(picture shown left)**

Steiner J, Matthews K. Endorectal Digital Prostate Tomosynthesis: Demonstration. 3rd Annual Inventorship Showcase, LSU Innovation and Technology Center, Baton Rouge, LA, May 2017. Demonstration.

Kirby K, "Brain activation patterns as a result of bilateral transfer of a visio-motor task" at Society for Neuroscience 2017 in Washington D.C. in November.

Newhauser W D. Integrating 3D Technologies for Personalized Treatments in Breast Cancer Radiation Therapy. Oral Presentation at: TEDxLSU; March 11th 2017; Baton Rouge, LA. **(picture shown right)**

Fontenot J. "Writing a practice guideline: from conception to birth," Oral Presentation, AAPM Annual Meeting, Denver, CO, August 2017.
Fontenot J. "Healthcare economic: from volume to value," Oral Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

Fontenot J. "Professional economics update," Oral Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

W. Donahue and W. Newhauser. "Towards a multi scale model of vascular dose for the whole brain," Poster Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

W. Newhauser, "Analytical methods for normal tissue dose reconstruction," Oral Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

D. Heins, J. Yoon, B. Guo, M. Sanders, and R. Zhang, "Flattening filter free volumetric modulated arc therapy for post-mastectomy breast irradiation," Poster Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

J. Yoon and R. Zhang, "Energy correction of TLD dosimetry at out-of-field region for arc therapy," Poster Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

J. Yoon and R. Zhang, "Out-of-field dose measurements for advanced post-mastectomy radiotherapy techniques," Poster Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

K. Hogstrom, "Bolus electron conformal therapy (ECT)," Oral Presentation, AAPM Annual Meeting, Denver, CO, August 2017.

Dr. Fontenot attended the Health Policy Board and Red Journal Editorial Board meetings. Dr. Fontenot and Todd Stevens also provided an overview of the MBPCC-OLOL Gamma Knife program to key customers at an Elekta-sponsored dinner event. Oral Presentation, ASTRO Annual Meeting.

Donahue, W., & Newhauser, W. D. Towards a Multiscale Model of Vascular Dose for the Whole Brain. Poster Presented at: AAPM Annual Meeting; July 30th – Aug. 3rd 2017; Denver, CO. and Radiation Research Society Annual Meeting; October 13th – 18th 2017; Cancun, QR, Mexico.