

1. Director's Message

Dear Alumni, Students, Staff, Colleagues, and Friends:

On behalf of the entire program, I am pleased to share with you this edition of the newsletter of the Medical Physics and Health Physics Program. The past year has been remarkable one, in many ways. Overall, the program sustained its momentum in education and research. Our current students continued to meet their milestones towards graduation. As ever, our graduates are highly sought after and successful in an extremely competitive postgraduate employment market. From colleagues who hire our former students, we continue to hear that our program prepared them well. Our doctoral program, first accredited in 2012, graduated several outstanding young scientists this year.

The continued success of the program was the result of sustained teamwork by our faculty, students, staff, administration, and sponsors. Evidence of this teamwork abounds. For example, this year the graduate student body grew to reach 31 students and our number of publication reached 32; both all-time records for our program. The excellence of our faculty and students was recognized via numerous awards, honors, international collaborations, and extramural funding. These accomplishments are truly remarkable considering the ubiquitous challenges of the declining levels of federal and state funding and changes in personnel.

Besides teaching, learning, and research, the activities of program were characterized by engagement at the local, national, and global scale. Our students and faculty are involved in research that has a direct and positive impact on cancer patients, but this past year saw our program's reach stretch far beyond the clinic. Our students participated in multiple community outreach events, educating youngsters and their parents about radiation; we supported future medical and health physicists with a prestigious undergraduate scholarship; many of our more senior students presented their research at national conferences; we had several students participate in research collaborations elsewhere in the United States and abroad; and one of our projects sparked a small social-media frenzy, getting picked up by news outlets around the world. All of these activities establish the Medical Physics and Health Physics Program as a player on the world stage.

Inclusion of underrepresented groups is a major topic in the US workforce today. We are proud of our diverse students, staff, and faculty. Women comprise approximately one of every three of our students, which is remarkable given that the pool available to us to recruit from (*e.g.*, holders of a BS in physics) contains only one in five. Our program continues to engage in a variety of outreach and recruiting efforts to increase inclusion.

This newsletter highlights many of the achievements of our team. On behalf of the whole team, we thank you for all you do for the program and we look forward to staying in touch with you in the future.

Sincerely,
Wayne Newhauser



Contents

1. Director’s Message	1
2. Trainee Milestones	3
2.1 <i>Graduations</i>	3
2.2 <i>Certifications</i>	4
2.3 <i>Matriculations</i>	5
3. Featured Stories	7
3.1 <i>NCI Grant Award for Technology Transfer of Intensity- Modulated Bolus Electron Conformal Therapy</i>	7
3.2 <i>Health in High Resolution: Better Diagnostic Imaging Developed at LSU</i>	8
3.2 <i>The Art of Science: Gallery Showcases Cancer, Bacteria Design by Meagan Moore</i>	10
3.3 <i>PhD Students Xiaodong Zhao Won 2nd Place in LSU’s 3-Min Thesis Competition</i>	11
3.4 <i>Dr. Newhauser Elected to President of SDAMPP</i>	11
3.5 <i>PhD Students Jinzhu Xu Received \$5000 Coates Research Scholar Award</i>	12
3.6 <i>Proton Radiotherapy Physics Workshop</i>	12
3.7 <i>Radiation Oncology Physics Residency Program Update</i>	13
3.8 <i>New Radiation Oncology Physics Journal Club @ MBPCC</i>	14
3.9 <i>Kenneth Hogstrom Superior Graduate Student Scholarship Opens New Opportunities</i>	16
3.10 <i>Winter Holiday Open House</i>	17
4. Grants	18
5. Honors and Awards	18
6. Medical and Health Physics Program in the News	18
7. Selected Publications	19
8. Seminars and Presentations	20

2. Trainee Milestones

2.1 Graduations



Amin Hamideh
MS-Health Physics
Advisor: Dr. Wei Hsung Wang
Graduation: Spring 2019
Job: LSU Radiation safety office



Cameron Sprowls
MS-Medical Physics
Advisor: Dr. Jonas D. Fontenot
Graduation: Spring 2019
Job: Therapeutic Radiologic
Physics Resident at University of
Florida Health Cancer Center –
Orlando



Bethany Broekhoven
MS – Medical Physics
Advisor: Dr. Kenneth Matthews
Graduation: Summer 2019
Job: Medical Physics Resident at
Medical University of South
Carolina in Charleston



Garrett Otis
MS-Health Physics
Advisor: Dr. Wei-Hsung Wang
Graduation: Summer 2019
Job: health physicist at Yale-New
Haven Hospital



Hanif Soysal
MS-Medical Physics
Advisor: Dr. Joyoni Dey
Graduation: Summer 2019
Job: Medical Physics Resident at
University of Mississippi Medical
Center



Lydia Wilson Jagetic
PhD-Medical Physics
Advisor: Dr. Wayne Newhauser
Graduation: Summer 2019
Job: post-doctoral fellowship at St.
Jude's Children's Hospital in
Memphis



William Donahue
PhD-Medical Physics
Graduation: Summer 2019
Advisor: Dr. Wayne Newhauser
Graduation: Summer 2019
Job: Residency training fellowship
at Yale in New Haven, Connecticut



Christopher Schneider
PhD-Medical Physics
Graduation: Summer 2019
Advisor: Dr. Wayne Newhauser
Graduation: Summer 2019
Job: Residency at Mary Bird
Perkins Cancer Center, Baton
Rouge



Daniel Dimarco
MS-Health Physics
Advisor: Dr. Kenneth Matthews
Graduation: Fall 2019
Job: Health physicist at Nuclear
Regulatory Commission,
Washington DC



Anthony Davila
MS-Health Physics
Advisor: Dr. Wei Hsung Wang
Graduation: Fall 2019
Job: Radiation Safety Specialist at
Tulane University, New Orleans



PhD Christopher Schneider celebrates graduation with advisor Dr.
Wayne Newhauser

2.2 Certifications

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



Payton Bruckmeier
PhD - Medical Physics
Passed Part I of the ABR Exam



Chia-Lung Chien
PhD - Medical Physics
Passed Part I of the ABR Exam



Audrey Copeland
MS - Medical Physics
Passed Part I of the ABR Exam



Troy Jacobs
MS - medical physics
Passed Part I of the ABR Exam



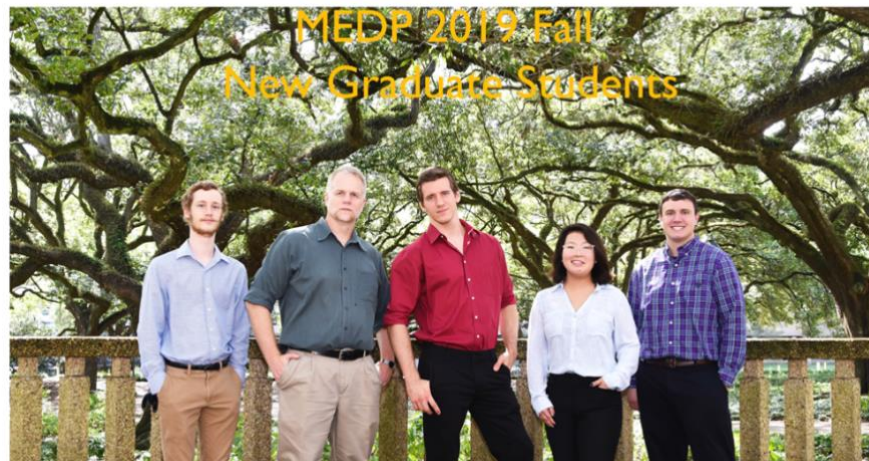
Krystal Kirby
PhD-Medical Physics
Passed Part I of the ABR Exam



Andrew McGuffey
MS-Medical Physics
Passed Part I of the ABR Exam

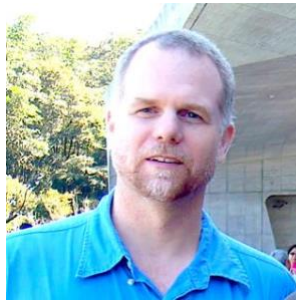
2.3 Matriculations

The program welcomed 5 outstanding new medical & Health physics students, who entered the program in the fall of 2019.





Reagan Dugan
PhD - Medical Physics BS/2019/
Missouri Univ. of Science &
Technology



Michael McMahon
MS-Health Physics BS/1993/
Louisiana State Univ.



Elizabeth Park
MS-Medical Physics
BS/2019/ Missouri Univ. of Science
and Technology



Michael Taylor
MS-Medical Physics BS/2019/ University
of West Florida



Charles Zimmerman
MS-Medical Physics BS/ 2019/University
of Utah



2018 and 2019 medical & Health physics graduate students

3. Featured Stories

3.1 NCI Grant Award for Technology Transfer of Intensity-Modulated Bolus Electron Conformal Therapy

Kenneth Hogstrom, Professor Emeritus

The Mary Bird Perkins Cancer Center (MBPCC) Electron Beam Therapy Physics Research Group, in collaboration with .decimal, LLC, was successful in receiving a two-year, \$2 million Phase II, Small Business Innovation Research (SBIR) grant commencing September 24, 2019, from the National Cancer Institute (NCI) for Product Development of Intensity Modulation for Bolus Electron Conformal Therapy. The Phase II grant is an extension of a \$246 thousand Phase I, Small Business Technology Transfer (STTR) grant, which it completed in September 2018. Kevin Erhart, PhD, President and Chief Technology Officer for .decimal, is the grant's principal investigator, and Kenneth Hogstrom, PhD, Senior Medical Physics Advisor, is principal investigator of the subcontract with MBPCC, .decimal's research partner.

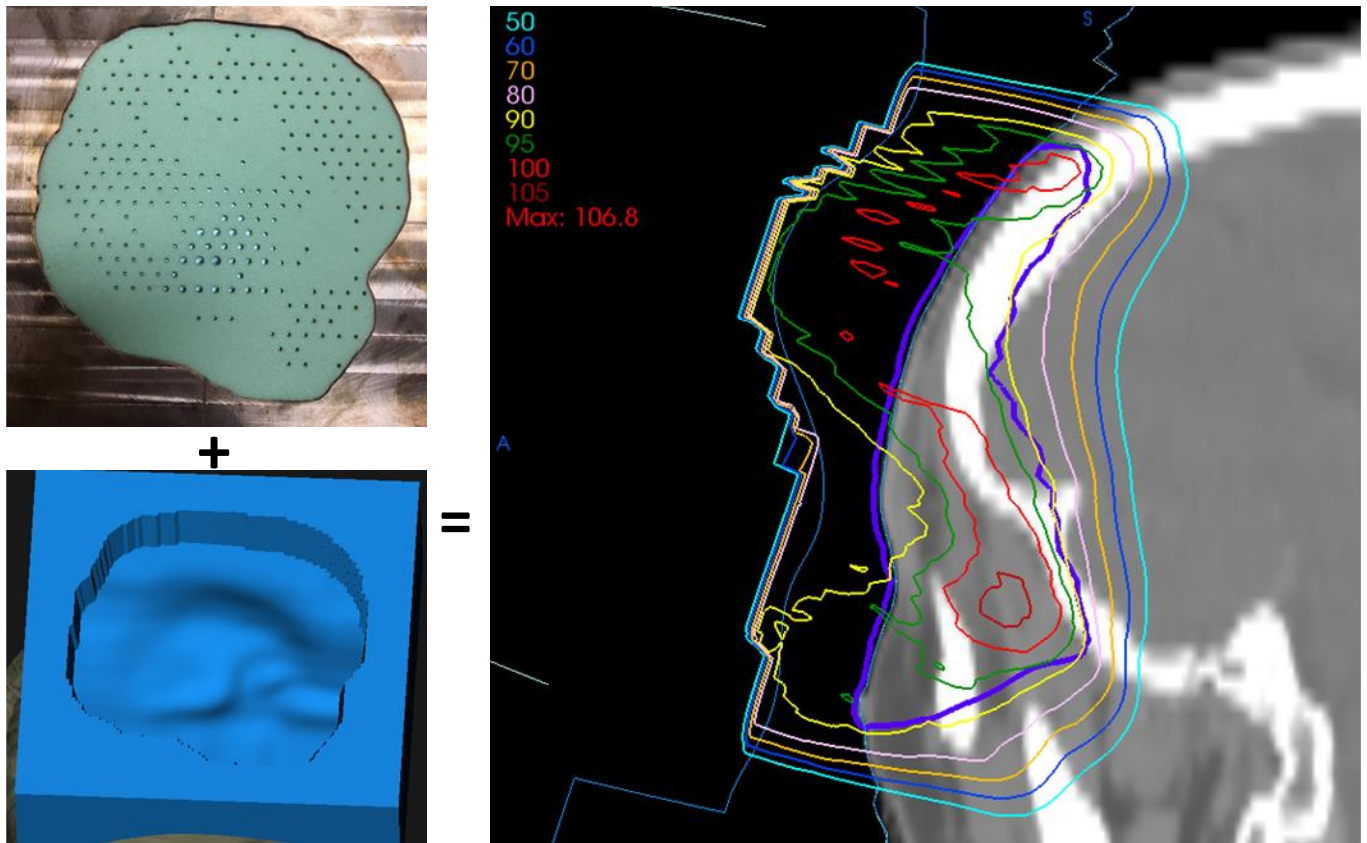
The Phase II grant was awarded based on a promising proposal and successful results of the Phase I grant, which included contributions from three LSU MS in Medical Physics graduate student theses: Erin Chambers (2016) "Design of a Passive Intensity Modulation Device for Bolus Electron Conformal Therapy", John Doiron (2017) "Benefit of Intensity Modulated Bolus Electron Conformal Therapy for Post Mastectomy Radiotherapy", and Elizabeth Hilliard (2018) "Verification and Evaluation of a Passive Intensity Modulation Device for Bolus Electron Conformal Therapy". In the Phase II grant, MS graduate student Joseph Scotto will be supervised by Dr. Garrett Pitcher for Aim 1 "Model electron scatter into and from island blocks", and PhD graduate student Andrew McGuffey will be supervised by Dr. Robert Carver for Aim 2 "Validate IM-BECT dose delivery in anthropomorphic phantoms". Aim 6 "Refine methods for factory and clinical PRIME quality assurance (QA)" is also planned to utilize a future graduate student.

Aim 3 of the grant "Develop an electron specific TPS (COMET-Plan) for IM-BECT", to be performed by .decimal engineering staff, should result in an unprecedented, electron beam therapy planning system, which will not only plan intensity-modulated bolus electron conformal therapy (IM-BECT), but also efficiently and effectively manage personalized electron therapy tools such as cutouts, skin collimation, eye shields, and bolus. Dr. Erhart states, "This project will leverage .decimal's personalized electron therapy tools, which is possible due to its company's expertise in machining custom treatment devices and its prior development of a proton planning system (Astroid) and electron conformal bolus design software (p.d)." In Aim 4 of the grant "Evaluate clinical utility of COMET-Plan software," MBPCC clinical staff will have opportunity to evaluate and provide feedback on software development. Dr. Hogstrom states, "We are very excited about the opportunity to see a clinical electron planning system being developed that is on par with those of other radiotherapy modalities and that easily plans using personalized devices."

Aim 5 of the grant "Discover the clinical utility of IM-BECT" will be a multi-institutional, retrospective treatment planning study that will compare IM-BECT and BECT dose plans to determine sites where IM-BECT gives the greatest reduction in dose spread with comparable normal tissue risks. This clinical study will include research partners at Washington University in St. Louis (James Kavanaugh, MS and Mackenzie Daly, MD), The University of Texas M D Anderson Cancer Center (Rajat Kudchadker, PhD and George Perkins, MD), Orlando Health University of Florida Health

Cancer Center (Sanford Meeks, PhD and Patrick Kelly, MD, PhD), and MBPCC (Connel Chu, MS and Robert Fields, MD).

Upon completion, .decimal is expected to provide future electron therapy patients access to state-of-the-art techniques such as IM-BECT, personalized electron therapy tools, and highly accurate, fast dose calculations. This will offer the potential for reduced normal tissue complications and secondary cancer risks to patients with superficial cancers.



Intensity modulator (upper left) consists of .decimal copper cutout containing a low-density foam insert embedded with tungsten cylindrical island blocks of variable diameters. Conformal electron bolus (lower left) is machined using blue machineable wax. Together, the two can deliver the intensity modulated bolus electron conformal therapy (IM-BECT) patient plan (right); PTV is purple contour. (from Hilliard 2018; patient data provided by alumni James Kavanaugh of Washington University in St. Louis)

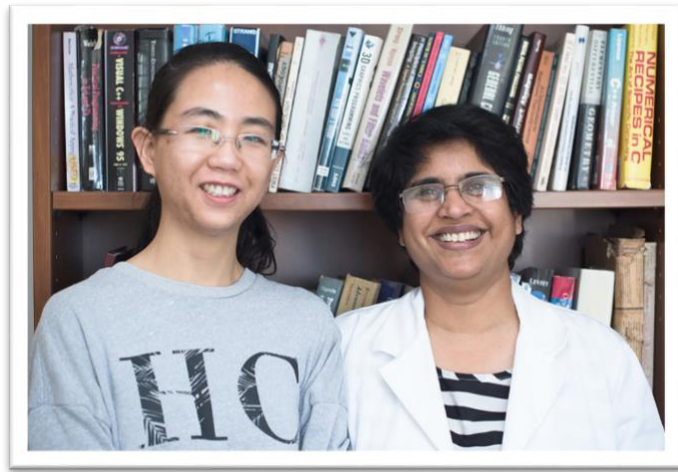
3.2 Health in High Resolution: Better Diagnostic Imaging Developed at LSU

Elsa Hahne, LSU Office of Research & Economic Development

Joyoni Dey, assistant professor in the LSU Department of Physics & Astronomy, received a LIFT₂ innovation and technology transfer grant from the LSU Board of Supervisors back in 2017 to improve X-ray and medical imaging for lung, breast, and bone scans, with the potential to save lives.

The emerging technology can potentially detect and diagnose tumors where conventional imaging techniques cannot. Dey has also received additional support through the Louisiana Board of Regents and has her second patent pending, this time for phase contrast X-ray interferometry:

“Compared to conventional imaging, we’re trying to achieve better quality diagnostic images that are



higher in contrast, while preserving the resolution and keeping the dose and radiation exposure as low as possible for the patient. I’m working on this emerging technology together with my Ph.D. student, Jingzhu Xu.

“While conventional imaging for X-ray and CT scans looks at the attenuation of photons as they travel through the body—more attenuation in bone, less in tissue—we’re providing two additional modalities, which are phase-shift and small-angle-scatter. We can observe both the attenuation and phase-shift, that is, observe the total refraction

index in tissue. Scatter can give us complimentary and higher contrast images as well, particularly in the lungs.

“Several X-ray interferometers already exist. They have shown improvements over conventional X-rays in terms of identifying breast tumors, classification of micro-calcifications—whether they’re malignant or not—as well as improving specificity of lung diseases, such as fibrosis, emphysema, and lung cancer. Our interferometry system is built from a special modulated phase grating and does not require an absorption grating as needed in interferometers at the forefront. Our system is different from state-of-the-art X-ray interferometers in that the extra phase and scatter information can be obtained at a dose of radiation no higher than a regular X-ray. Our system, if successful, could be used as a powerful screening tool.

“We’re focusing on the breast right now. Breast cancer affects 1 in 8 women, and I was always interested in breast imaging, its applications, and the challenges of interferometry. Also, we have two interferometers available at LSU for us to use, which we can adapt for this research. When our system is fully developed, with the extra modalities on same scan requiring no extra dose to the patient—we will potentially be able to identify tumors where conventional X-ray imaging cannot, providing both higher disease detection sensitivity and specificity. Earlier disease detection and treatment is known to improve survival rates, not just for breast cancer, but for lung cancer as well, which is the highest killer in the U.S. right now. Our technology, once it goes to the clinic, has the potential to save lives. In a nutshell, we can help clinicians visualize lung and breast tissue, as well as bone and cartilage, and potentially give them much better information about a particular disease.

“I’m now getting ready to resubmit our R21 grant application to the NIH this November. We got very good feedback in the last round, so I’m hopeful.”

3.2 The Art of Science: Gallery Showcases Cancer, Bacteria Design by Meagan Moore

By Libby Haydel. November 12, 2019

BATON ROUGE, LA – The art of LSU Biological Engineering senior Meagan Moore will be featured as part of “Metis-Muses: Women of Art Through Science” at The Healthcare Gallery and Spa in Baton Rouge through Jan. 21.

As a BE student, Moore is known in the college for her design of “Marie,” a 3D-printed, 5-foot-1-inch purple model used for cancer radiation therapy research. The life-size “Marie” will be part of Moore’s art display, along with other pieces inspired by her cancer research. One work, called “Cancer Mandala,” features a smaller model of “Marie” in front of a mandala, a geometric figure representing the universe in Hindu and Buddhist symbolism. “Cancer Mandala” combines data Moore collected from the various particle accelerators used in her research with histological image samples of different types of cancer.

“Mandalas are made by monks to guide practitioners to enlightenment and are often painted, woven, made of sand, and sometimes 3D,” Moore said. “The destruction of the sand mandala is a highly ceremonial process, where the piece is parted out and released back into nature. Similarly, certain cancer treatments literally and metaphorically take a person apart or remove the cellular issues manifesting within the physical form.”

The outermost layers of the mandala include various graphs and functions that are utilized to propagate therapeutic beams and function as part of the “tool box” of a medical physicist. Moving inward, there are a series of concentric circles, based on data collected in Moore’s research, representing the regions of interest that were tested on the full-scale “Marie.” Starting from the outer four rings, the data for the thyroid is parted out, with each circle representing a different machine utilized to collect data and the amount of dose-per-dose gray done at varying field sizes. The innermost rings represent the breast/chest, pacemaker and fetus. The small model of “Marie” at the center was used in the prototyping process to design and build the full-scale model.

Another of Moore’s pieces, “Marine Snow: Diatoms, Radiolarians, Dinoflagellates,” features resin and acrylic pieces designed to represent actual marine snow, a continuous lilt of organic material that falls from the upper surface waters of the ocean to the depths where this is little to no sunlight. Moore scanned electron microscopy images of diatoms, dinoflagellates and radiolarians to create this piece, which sits on a backlit box that provides color coding to gallery visitors.

Her “Apoptosis” piece “seeks to analyze the calculated death that cells can undergo,” Moore said. The central focus is an apoptosome, which is a large quaternary protein structure formed in the process of apoptosis, which is cell death. The circular facets of this mandala are composed of the genetic code of the apoptosome.

Other pieces by Moore include a Petri dish with images shaped out of bacteria, one of which is a bee called “The Most Important Species on Earth.”

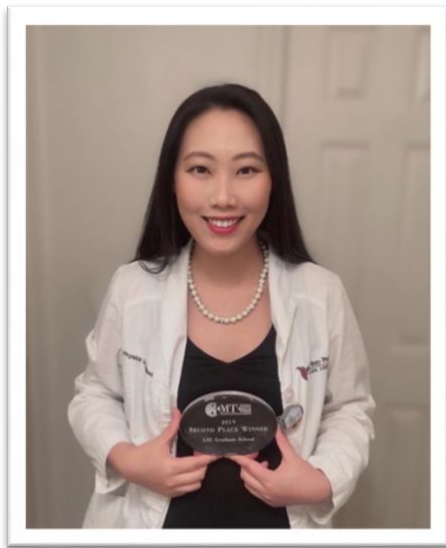


“This piece focuses on bees, which were recently acknowledged to be the most important species on Earth,” Moore said. “I hope this piece will imbue a sense of the importance of ‘bee-ing’ rather than seeming and perhaps an enchanting notion to explore the worlds that make our very world exist.”

Moore credits Claire Luikart, Cathlin Disotell and Mary Miller for helping her with these pieces.

The Healthcare Gallery and Spa is located at 3488 Brentwood Drive, Suite 103. The gallery is open to the public during spa business hours, Monday-Friday, 9 a.m.-5 p.m.

3.3 PhD Students Xiaodong Zhao Won 2nd Place in LSU’s 3-Min Thesis Competition



The Three Minute Thesis (3MT®) is an international research communication competition. The exercise challenges Masters and Ph.D. students to present a compelling oration on their thesis topic and its significance in just three minutes. 3MT® develops academic, presentation and research communication skills and supports the development of research students’ capacity to effectively explain their research in language appropriate to a non-specialist audience. LSU hosted the completion at the week of November 12-15, 2019 at the Digital Media Center Theater.

Our Medical Physics PhD student Xiaodong Zhao won the 2nd place in the final round and received \$750 travel award.

Read more: <https://www.lsu.edu/graduateschool/3mt.php>

3.4 Dr. Newhauser Elected to President of SDAMPP

Wayne D. Newhauser, the Dr. Charles M. Smith Chair of Medical Physics, professor and director of LSU Medical and Health Physics, has been elected president of SDAMPP (Society of Directors of Academic Medical Physics) by the Officers and Board of the Society of Directors of Academic Medical Physics Programs.



3.5 PhD Students Jinzhu Xu Received \$5000 Coates Research Scholar Award

Charles E. Coates Scholar Research Grants are unrestricted awards made from the Dr. Charles E. Coates Memorial Fund Research. These competitive awards are made to support promising doctoral research by superior graduate students in Physics & Astronomy. Each award is for \$5000/year, with a possibility of a second year of funding. A maximum of one award will be active in the Department of Physics & Astronomy at any one time. Funds will be placed in restricted accounts; expenditure categories will follow accepted University regulations. Accounts will be established in the major professor's name, but expenditures must be directly related to the Scholar's proposed and approved research. Annual award amounts or frequency may increase, based on future availability of funds. This award is available only to Ph.D. students who have successfully completed the general examination in the Department of Physics & Astronomy. Students may receive this award once during their Ph.D. studies. Selection criteria include proposal content, major professor's recommendation letter and overall scope of the proposal.

Our Medical Physics PhD Jinzhu Xu received 2019 Coates Research Scholar Award with \$5000!

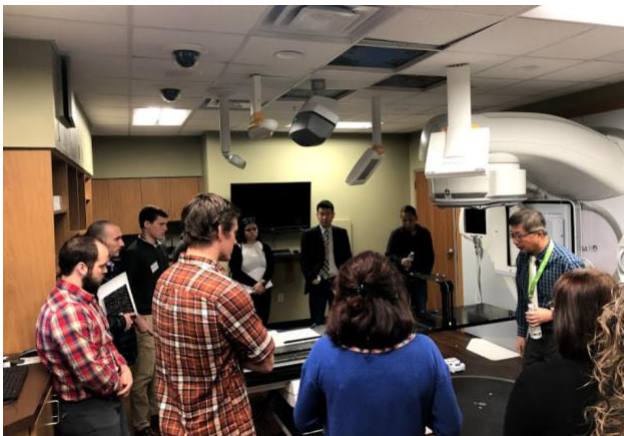
Read more: https://www.lsu.edu/physics/graduate-programs/physicsastronomy/coates_research_scholar_award-browne.pdf



3. 6 Proton Radiotherapy Physics Workshop

November 15-16, 2019

A large group of students and residents attended the Proton Radiotherapy Physics Workshop in Shreveport to learn more about proton therapy. They heard many talks throughout the day and the students got a personalized tour of the Willis-Knighton Cancer center and proton gantry.



2600 Kings Highway
Shreveport, Louisiana 71103

Proton Radiotherapy Physics Workshop

sponsored by IBA with continuing education credits facilitated by SWAAPM



When: Fri. Nov. 15, 2019 (8:00 am – 5:00 pm)
Sat. Nov. 16, 2019 (8:00 am – 12:30 pm)

Why: Knowledge + Continuing Education
(This meeting has applied to CAMPEP for approval of 11.5 MPCEC hours and been approved for 10.5 MDCB credits)

Cost: \$150 (both days) / \$100 (Fri.) / \$50 (Sat.)
breakfast, lunch, dinner on Friday and breakfast on Saturday will be provided

Register by Nov. 1, 2019:

<https://classes.wkhs.com/SectionListing.aspx?link=584>

or by phone: (318) 212-8225

Please join us at Willis-Knighton Cancer Center (WKCC) in Shreveport, LA for a proton radiotherapy physics workshop. Consisting of didactic presentations and practical demonstrations, this workshop is designed as an introduction to the implementation and utilization of proton therapy in a community or regional cancer center for medical physicists, dosimetrists, and physics residents/students. Topics to be covered include the basics of proton physics and dosimetry as well as technical aspects and experience (commissioning, QA, etc.) of proton implementation and utilization on various proton therapy system including WKCC's IBA Proteus[®]ONE compact, image-guided, pencil-beam scanning, intensity-modulated proton therapy system.

Speakers

- Dr. Mark Pankuch, Ph.D., DABR, Northwestern Medicine Chicago Proton Center, Chicago, IL
- Dr. Jacob Flanz, Ph.D., Burr Proton Therapy Center, Massachusetts General Hospital, Boston, MA
- Dr. Xuanfeng "Leo" Ding, Ph.D., DABR, William Beaumont Hospital, Royal Oak, MI
- Dr. Xiaoning Ding, Ph.D., DABR, Mayo Clinic Arizona, Phoenix, AZ
- Dr. Kuan Ling "Gwen" Chen, Ph.D., DABR, WKCC, Shreveport, LA
- Dr. Terry Wu, Ph.D., DABR, WKCC, Shreveport, LA
- Dr. Lane Rosen, M.D., DABR, WKCC, Shreveport, LA
- Dr. C. Jake Wang, M.D., DABR, WKCC, Shreveport, LA
- Dr. Joseph Sylh, Ph.D., DABR, WKCC, Shreveport, LA
- Dr. Matthew Maynard, Ph.D., DABR, WKCC, Shreveport, LA
- Dr. Joseph P. Dugas, Ph.D., DABR, WKCC, Shreveport, LA
- Ms. Megan Rodrigues, B.S., CMD, WKCC, Shreveport, LA
- Mr. Chris Henry, B.S., CMD, WKCC, Shreveport, LA



More Info/Media: www.wkhs.com/Cancer.aspx | www.youtube.com/watch?v=IY0j936JFso
www.youtube.com/watch?v=RiVA5mqnHfk

3. 7 Radiation Oncology Physics Residency Program Update

Jonas Fontenot, PhD

Program Director

Mary Bird Perkins Cancer Center Residency Consortium

Each New Year brings an opportunity for reflection, evaluation, and a fresh start for the upcoming year. For most academic medical physics programs, the New Year also signals the time of year to begin the annual recruitment process and to begin planning for the admission of new trainees for the upcoming academic year. Accordingly, the Mary Bird Perkins Cancer Center (MBPCC) radiation oncology physics residency program committee is in the process of reviewing applications for the July 1 admissions cycle. The 2020 matriculating residents will constitute the 12th class of physics residents at MBPCC. The program has undergone considerable growth and evolution since admitting its first resident in 2009. From the beginning, the program was geared toward admitting students completing graduate degrees in medical physics from the Louisiana State University program, which is jointly supported by MBPCC. In anticipation of the looming requirement by the American Board of Radiology that medical physicists complete residency training prior to becoming board eligible, MBPCC began exploring partnerships that would provide additional residency opportunities for LSU-MBPCC Medical Physics Program graduates. In 2011, under a consortium or "hub and

spoke” model, the program was expanded to include affiliated sites at Willis Knighton Cancer Center (WKCC) in Shreveport, LA; the University of Mississippi Medical Center (UMMC) in Jackson, MS; and Oncologics in Lafayette, LA. CAMPEP Accreditation for the Consortium Program was initially awarded in 2012.

To date, the Consortium Program has produced 33 graduates from MBPCC and its affiliate partners, 15 which also were LSU Medical Physics Program graduates. Program graduates have experienced 100% placement into career positions, and 97% of eligible candidates have become board certified in therapeutic medical physics by the ABR. Our graduates hold medical physics positions at academic centers, community oncology centers, private practice groups, and industrial companies across the country, from Anchorage to Miami.

Each year, the Program typically receives about 90 applications for admission. From those applications, the Program admits 4 new residents, 2 at MBPCC and 1 each at WKCC and UMMC. Positions are filled through a national match process that continues to provide priority admission to LSU medical physics program graduates.

The Program’s curriculum, which is continually evaluated by its faculty, prepares residents for the demanding technical and professional requirements of contemporary radiation oncology. Importantly, each and every resident in our Program is called upon to make important contributions to their clinics that support patient care programs at their home institution throughout their time in the program. The training is difficult and rigorous, but our residents invariably rise to the challenge and become key members of the patient care team. Ultimately, the training our residents receive and the experience they gain during their time in the program can propel them into many different types of career positions that match their goals and interests. We are proud of our graduates and Program!



2019 Graduates (L-R): John Doiron, MS took a position at HannLeb Physics, Inc. - Johnson City, TN and Abingdon, VA (Ballad Health Care System). Fei Duan, MS took a position at 21st Century Oncology, Wellington, FL. Nick Marsh, MS took a position at Ironwood Cancer and Research Center, Chandler, AZ. Brittany (Moore) Earl, MS took a position at McLeod Regional Medical

3.8 New Radiation Oncology Physics Journal Club @ MBPCC

David Solis

Beginning in July of 2019, medical physics graduate students and faculty members joined together to form a monthly journal club focusing on technology, applications, and interventions in radiation oncology. The Journal Club is held at Mary Bird Perkins Cancer Center and seeks to develop a friendly community where students and faculty can gather to discuss, challenge, and encourage collaboration with each other through the presentation of new research material and recent advances in their respective fields of interest. The presentation experience is extremely

valuable for graduate students at the beginning of their research careers, since the opportunity provides an opportunity to develop and practice their skills while also gaining constructive criticism in regards to their research topics and methodology through lively discussion.

Each month two presenters are given 30 minutes each, with ~15 minutes allotted to the speaker's presentation of materials and ~15 minutes dedicated for audience discussion and questions/answers. Presentations have ranged from preliminary research aims in deep learning and treatment plan automation to an advanced topics seminar given by our very own Professor Emeritus Dr. Kenneth Hogstrom.



Since that first meeting in July, the attendance has increased from a small membership of nearly 8 researchers to a research community of nearly 20 members strong. The photo above shows the group at our recent holiday pizza party in December, where we celebrated the end of the semester while brainstorming future topic ideas for the next semester's journal club meetings. Future topics from the list include: FLASH therapy, MR-Simulation, machine learning and deep learning techniques in medical physics, the economic considerations of radiation therapy, new advances in heavy-ion radiotherapy, and many more.

We're looking forward to the future growth of the journal club and many more interesting topics and discussions. Meetings are typically held during the last week of the month. If you would like to know more about the Journal Club, please contact Dr. David Solis at dsolis@marybird.com for more information.

3.9 Kenneth Hogstrom Superior Graduate Student Scholarship Opens New Opportunities

Louisiana Board of Regents' awards matching funds to benefit students in Mary Bird Perkins–LSU's joint medical physics program

Due to significant student achievements, outstanding faculty and medical physics program education quality, the Louisiana Board of Regents, or BOR, has granted five sets of matching funds to the Kenneth R. Hogstrom Superior Graduate Student Scholarship fund, which provides support for the Mary Bird Perkins Cancer Center–LSU joint medical physics program.

Established in honor of Kenneth R. Hogstrom's outstanding research, scholarship and mentorship of graduate students, the Kenneth R. Hogstrom Superior Graduate Student Scholarship supports medical physics graduate students participating in leading-edge radiation oncology clinical research at Mary Bird Perkins Cancer Center, while earning their MS or PhD from LSU.

As a highly acclaimed educator and researcher, Hogstrom has had a remarkable impact on practice in the field of radiotherapy. Hogstrom integrated teaching, research and clinical practice to investigate and advance areas at the forefront of radiation oncology such as neutron, pion, image-guided, intensity- modulated, stereotactic, targeted and electron radiotherapy.

“One of the greatest phases of my career has been working with my colleagues at Mary Bird Perkins and LSU and establishing one of the most respected medical physics training programs in the country,” said Hogstrom, who is an LSU Department of Physics & Astronomy professor emeritus and senior medical physics advisor at Mary Bird Perkins. “The funds, which we have received annually over the last several years, demonstrate the Board of Regents' belief in the strength of this program and its importance to the national healthcare community in producing the highest quality medical physics professionals in the country.”

Having now received over \$500,000 — more than \$300,00 from donors and \$200,00 from BOR grants — since the establishment of the endowed fund in 2015, it is now feasible to award its first medical physics graduate student scholarship in 2020.

The Mary Bird Perkins–LSU Medical Physics partnership provides for a multi-layered joint academic and research program between the two organizations. Created in 2004, it 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. The partnership supports an MS program, PhD program and residency program within this elite and highly specialized discipline, and continues to attract the brightest minds from around the world.

“We appreciate the Board of Regents' recognition of our joint program through this award,” said Jonas Fontenot, chief of physics and chief operating officer, Mary Bird Perkins Cancer Center, and LSU Department of Physics & Astronomy adjunct professor. “It is because of this type of support and the generosity of the community that we are able to continue advancing cancer care at such a rapid pace. There are many opportunities for individuals, corporations and others to help make a difference in this nationally recognized medical physics training program.”



3.10 Winter Holiday Open House

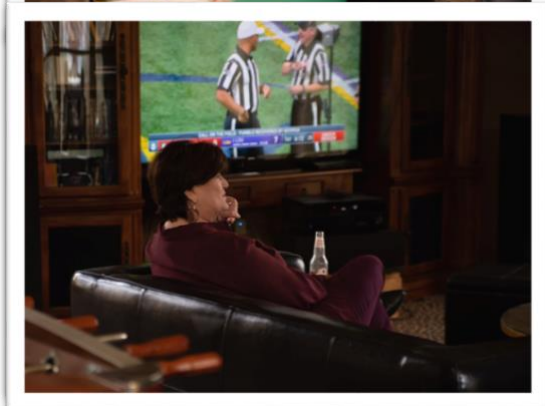
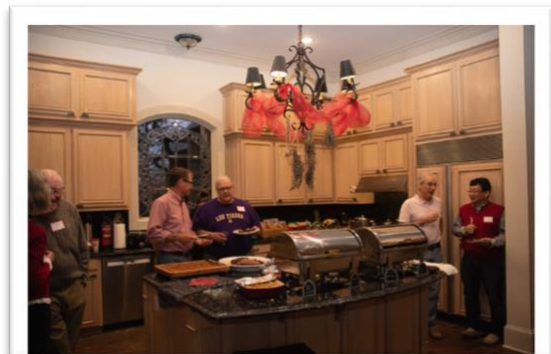
December 7, 2019

Medical & Health physics annual open house/Xmas party at director Dr. Newhauser's home on Dec. 7.

Dr. Newhauser and Mrs. Newhauser welcomed students, faculties, and colleagues at their house. It becomes our program tradition for years!

What a wonderful time to mingling, to enjoy delicious food, and watch a football game together! LSU won SEC Championship at the night!

Dr. Newhauser especially made German tradition hot red wine for everyone. It was so delicious and fills you with a warm glow in this beautiful night.





4. Grants

- Inaugural Kenneth R. Hogstrom Superior Graduate Student Scholarship

5. Honors and Awards

1. Dr. Newhauser has been elected to president of SDAMPP
2. PhD student Xiaodong Zhao won 2nd place in LSU's 3-min thesis competition.
3. PhD Students Jinzhu Xu Received \$5000 Coates Research Scholar Award
4. MS student Stephanie Wan received \$10,000 inaugural Kenneth R. Hogstrom Superior Graduate Student Scholarship

6. Medical and Health Physics Program in the News

- Our newly hired assistant professor Dr. Jeffery Chancellor in safety and health magazine: "Deep-space radiation may impair astronauts' cognitive function: study" Read more: <https://www.safetyandhealthmagazine.com/articles/18975-deep-space-radiation-may-impair-astronauts-cognitive-function-study?fbclid=IwAR2AhxnRyvMCUSyfRQNsOzS77f-4fxkZJxUkyJTEpOUHixB1HN8Pbhgr2IE>
- Previous intern Jasmine Jones in the video from Chicago: "Black women in STEM" . Jasmine Jones did a summer REU (research experiences for undergraduates) project with Dr. Rui Zhang in 2015. The research project is about calibrating the high-density magnetic port within breast tissue expanders to achieve more accurate dose calculations for post-mastectomy patients with immediate breast reconstruction.

Based on her work, she won the 2nd place in the Oral Presentation Competition at LSU Undergraduate Research Conference and the 1st place in Biophysics Category, Gulf Coast Undergraduate Research Symposium held at Rice University in 2015. Her abstract, in which she served as the first author, was also accepted by the Women in Physics Conference in San Antonio and the American Physics Society March Meeting in Baltimore in 2016.

7. Selected Publications

- P. Wall and J.D. Fontenot, “[Evaluation of complexity and deliverability of prostate cancer treatment plans designed with a knowledge-based VMAT planning technique](#),” J Appl Clin Med Phys. 2019 Dec 9. doi: 10.1002/acm2.12790.
- Krystal M. Kirby, Sreekrishna Ramakrishna Pillai, Owen T. Carmichael, and Arend W. A. Van Gemmert. [Brain functional differences in visuo-motor task adaptation between dominant and non-dominant hand training](#). Experimental Brain Research volume 237, pages 3109–3121 (2019).
- N. Bhusal, J. Dey, J. Xu, K. Kalluri, A. Konik, J. M. Mukherjee, P. H. Pretorius, “[Performance Analysis of a High-Sensitivity Multi-Pinhole Cardiac SPECT System](#)”, Medical Physics vol. 46, no. 1, pp. 116-126, Jan 2019.
- Lydia J. Wilson, Wayne D. Newhauser, Christopher W. Schneider. “[An objective method to evaluate radiation dose distributions varying by three orders of magnitude](#)” Med. Phys. 46 (4), April 2019.
- Steve Braunstein; Li Wang; Wayne Newhauser; Todd Tenenholz; Yi Rong; Albert van der Kogel; Michael Dominello; Michael C. Joiner; Jay Burmeister “[Three discipline collaborative radiation therapy \(3DCRT\) special debate: The United States should build additional proton therapy facilities](#).” J. Appl Clin Med Phys 2019; 20:2: 7-12.
- Blue RS, Chancellor JC, Suresh R, Carnell LS, Reyes DP, Nowadly CD, Antonsen EL. [Challenges in Clinical Management of Radiation-Induced Illnesses During Exploration Spaceflight](#). Aerosp Med Hum Perform. 2019 Nov 1;90(11):966-977.
- Blue RS, Chancellor JC, Antonsen EL, Bayuse TM, Daniels, VR, Wotring, VE, [Limitations in Predicting Radiation-Induced Pharmaceutical Instability during Long-Duration Spaceflight](#). Nature Microgravity, Jun;5(1) (2019).
- Chancellor JC, Guetersloh SB, Cengel KA, Ford J, Katzgraber HG, [Targeted nuclear spallation from moderator block design for a ground-based space radiation analog](#) Nature Microgravity, submitted (arXiv:1706.02727v2) (2019).
- SA, Y., Zhang, R. (2019). [An atlas-based method to predict three-dimensional dose distributions for cancer patients who receive radiotherapy](#). Physics in Medicine and Biology, 64(8): 085016.
- Xie, Y., Bourgeois D., Guo, B., Zhang, R. (2019). [Post-mastectomy radiotherapy for left-sided breast cancer patients: comparison of advanced techniques](#). Medical Dosimetry, in press.
- Pandey, A., *SA, Y., Guo, B., Zhang, R. (2019). [Feasibility of generating synthetic CT of brain from T1-weighted MRI using a linear mixed-effects regression model](#). Biomedical Physics & Engineering Express, 5, 047004.
- Braunstein S, Wang L, Newhauser W, Tenenholz T, Rong Y, van der Kogel A, Dominello M, Joiner MC, Burmeister J. [Three discipline collaborative radiation therapy \(3DCRT\) special debate: The United States should build additional proton therapy facilities](#). J Appl Clin Med Phys 2019; 20:2: 7–12.
- Schneider CW, Newhauser WD, Wilson LJ, Kapsch RP. [A physics-based analytical model of absorbed dose from primary, leakage, and scattered photons from megavoltage radiotherapy with MLCs](#). Phys Med Biol. 2019 Sep 19; 64 (18):185017.

- M. F. Moyers, T. Toth, R. Sadagopan, A. Chvetsov, J. Unkelbach, R. Mohan, D. Lesyna, L. Lin, Z. Li, F. Poenisch, W. Newhauser, S. Vatnitsky, J. B. Farr. [Physical uncertainties in the planning and delivery of light ion beam treatments: Report of AAPM Task Group 202](#). American Association of Physicists in Medicine
- Naseri M, Rajabi H, Wang J, Abbasi M, Kalantari F, “[Simultaneous respiratory motion correction and image reconstruction in 4D-multi pinhole small animal SPECT](#)” Med Phys. 2019 Nov;46(11):5047-5054. doi: 10.1002/mp.13807. Epub 2019 Sep 21.

8. Seminars and Presentations

- Hamideh AM, Wang W-H. Using barium-133 as a surrogate for iodine-131 in a silver zeolite cartridge for air sampling. The 5th International Conference on Environmental Radioactivity, September 8-13, Prague, Czech Republic, 2019.
- Wang W-H, Robinson J, Hamideh AM. Investigation of elevated radiation exposure from debris of a renovation project. The 5th International Conference on Environmental Radioactivity, September 8-13, Prague, Czech Republic, 2019.
- DiMarco DJ, Matthews II KL, Wang W-H. Visualization of radioiodine distribution in silver zeolite cartridges with gamma-ray imaging. The 64th Annual Meeting of the Health Physics Society, July 7-11, Orlando, FL, 2019.
- Robinson J, Hamideh AM, Wang W-H. Response to a spill involving lutetium-177 in a radiation use facility. The 64th Annual Meeting of the Health Physics Society, July 7-11, Orlando, FL, 2019.
- Davila AD, Fletcher JF, Matthews II KL, Wang W-H. Evaluating feline release criteria following iodine-131 treatment for hyperthyroidism. The 64th Annual Meeting of the Health Physics Society, July 7-11, Orlando, FL, 2019.
- Kirby, K., Pillai, S., Brouillette, R., Keller, J., De Vito, A., Bernstein, J., Van Gemmert, A. W., Carmichael, O. T. “Performance and brain activation in a dual task mimicking distracted walking.” Alzheimer’s Imaging Consortium at the Alzheimer’s Association International Conference, Los Angeles, CA, July 2019.
- Kirby, K., Carmichael, O., Van Gemmert, A. “Brain activation changes as a result of bilateral transfer of a visuomotor task.” Presented as an oral blitz presentation at the Pennington Biomedical Scientific Retreat, Baton Rouge, LA, May 2018. Phillip DH Wall and Jonas D Fontenot. VMAT plan complexity feature analysis for predicting quality assurance outcomes using forests of extremely randomized decision trees. AAPM Annual Meeting, 2019.
- Lis, Donetti, Steinsberger, Wolf, Paz, Newhauser, Durante, Graeff. A clinical quality assurance concept for conformal motion-synchronized dose delivery system used for four-dimensional ion therapy.
- Lis, "Experimental validation of conformal motion mitigation in particle therapy". RRS Annual meeting, 1-6th November. San Diego, California, USA
- M.Lis, W.Newhauser, M.Wolf, M.Donetti, C.Graeff. “ Experimental feasibility of motion-synchronized ion beam delivery” DGMP Annual meeting, 18-21 September. Stuttgart, Germany

- M. Lis, M. Donetti, C. Sauter, M. Wolf, C. Graeff, W. Newhauser. "A Modular Control System for Treating Moving Targets with Scanned Ion Beams: Design, Development, and Preliminary Test Results". OMA International Conference on Medical Accelerators and Particle Therapy, 4-6th September. Seville, Spain
- M. Lis, W. Newhauser, M. Donetti, C. Graeff, " Implementation and first tests of the CNAO dose delivery system at GSI." Poster at PTCOG58, 10-15th June, 2019. Manchester.
- Phillip DH Wall and Jonas D Fontenot. VMAT plan complexity feature analysis for predicting quality assurance outcomes using forests of extremely randomized decision trees. AAPM Annual Meeting, 2019.
- Chancellor, JC. "The Operational Space Radiation Environment and Mitigation Strategies." Department of Defense (DoD) Radiation Working Group, Defense Health Headquarters, Washington, D.C. June 2019
- Chancellor, JC. "The Operational Space Radiation Environment." NASA Exploration Medical Capabilities (ExMC) Technical Interchange Meeting. Johnson Space Center, Houston, TX. June 2019
- Chancellor, JC. "Radiation is Hard: Challenges of Pathogenesis and Translation into Clinical Outcomes." Principles of Aerospace Medicine Short Course, University of Texas Medical Branch, Galveston, TX. June 2019
- McGuffey, A. and Sick, J. "Evaluation of an In-House Respiratory Tracking System for Phase Binning of Elekta Machine Log-File Control Points". AAPM Annual Meeting, San Antonio, TX, July 2019.