LSU/MBPCC Medical Physics News

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LSU College of Science Department of Physics & Astronomy | Mary Bird Perkins Cancer Center

Newsletter of the LSU/MBPCC Medical Physics and Health Physics Graduate Education Program

Vol. 2, No. 1

Notables

In 2015, 100 percent placement of graduates continues, with all graduates entering residencies.

Five new students join our program in August.

Faculty and students set new program record in 2014 for the number of research publications.

We had four new faculty appointments in 2015.

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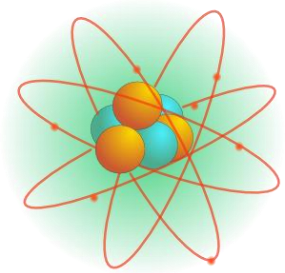


Announcements

- Save the date! The third annual LSU/MBPCC luncheon will be held in conjunction with the 2015 AAPM annual meeting to be held Wednesday, July 15th, from 7:00-9:00 PM. The first announcement with details will follow shortly.
- All of our medical physics students who will graduate in summer 2015 successfully participated in the inaugural cycle of a national matching program. The program matches graduates with residency positions using a similar system to the one used for physician residency programs.
- Dr. Rui Zhang will be joining the medical physics program faculty in August 2015 as a tenure-track assistant professor.

Medical Physics Program Remains Strong

As universities across the nation face declining budgets and other economic challenges, the medical physics and health physics program remains strong and vibrant. In fact, LSU and MBPCC have demonstrated their commitment to fostering and growing the medical physics program by expanding its team of educators. According to Dr. Wayne Newhauser, the program's director, faculty searches have been conducted every year since 2010, resulting in four new faculty members hired into tenure or tenure-track positions at LSU. The hiring required concerted efforts by faculty search committees, faculty leaders, and administrators.

In 2015, we received more than 70 applications for student admission, a new record for the program. Applicants tell us they are attracted by the high quality of the training, our faculty, and the research experience they stand to gain. The MBPCC residency program is an additional enticement. The program admitted five outstanding students who will begin in August of this year.

At MBPCC, there have been many changes, notably our move from temporary construction trailers to a newly renovated space within Mary Bird Perkins – Our Lady of the Lake Cancer Center. The offices, laboratories, and classrooms are spacious, quiet, and conducive to excellence in education, research, and patient care. We are truly fortunate to have such an outstanding environment in which to work.

With the completion of several large extramurally funded projects in the last year, our faculty have initiated new applications for cutting-edge research projects. Several awards have been received so far in 2015. Look for a feature story on the evolving research portfolio in the December issue of this newsletter.

Lastly, as state funding for higher education continues to shrink, the importance of alumni gifts increases. If you are contacted by LSU or MBPCC regarding fundraising, please take a few moments of your time to reflect on what the program means to you. Your support has never been more important than it is this year.

100% Placement Rate Despite National Residency Shortage

Tony Mazza and Wayne Newhauser at the graduation ceremony in May 2015

Once again, 100 percent of our graduates were placed in residency programs. This year, for the first time, students participated in the new American Association of Physicists in Medicine Medical Physics Match Program. Out of approximately 300 applicants for 110 positions nationwide, all five of our upcoming summer 2015 graduating LSU students placed for a residency position with a July 1 start date. Please join us in congratulating Hatim, Garrett, Nick, Ryan, and Colie!

- Hatim Chafi – Mary Bird Perkins Cancer Center – Baton Rouge, LA
- Nick Petersen – Christiana Care Health System – Newark, Delaware
- Garrett Pitcher – UFHealth Cancer Center – Orlando, FL
- Ryan Schurr – Baylor Scott & White Health – Temple, TX
- Runyon "Colie" Woods – University of North Carolina at Chapel Hill – Chapel Hill, NC

Mazza Graduates, Begins Residency

Joe Steiner, recipient of the Outstanding Teaching Assistant Award

Tony Mazza completed his MS degree in medical physics in February and walked in the graduation ceremony in May. Tony's thesis reported on an investigation of a novel solid state microdosimeter that may have applications in radiation therapy. Tony began residency training at MBPCC in March.

Honors & Awards

Dr. Kip Matthews, recipient of the Outstanding Faculty Award

Congratulations to Joe Steiner, who won the Outstanding Teaching Assistant Award from the Department of Physics & Astronomy. Joe is a PhD student in the program.

Dr. Kip Matthews, associate professor and deputy program director, won the Outstanding Faculty Award.

The journal Physics in Medicine and Biology recently selected the following paper as a "Featured Article". Eley JG, Newhauser WD, Richter D, Lüchtenborg R, Saito N, Bert C. Robustness of target dose coverage to motion uncertainties for scanned carbon ion beam tracking therapy of moving tumors. Phys. Med. Biol. 60:1717-40, 2015. http://stacks.iop.org/0031-9155/60/1717

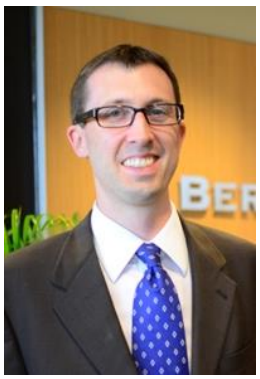
"Anonymization of DICOM Electronic Medical Records for Radiation Therapy" by Newhauser WD, et al., Computers in Biology and Medicine, 2014, was selected by the referees and by the editorial board of Computers in Biology and Medicine as an Honorable Mention Paper (Top 10 percent), out of 225 papers published in that journal during 2014.

Faculty Appointments

We would like to formally recognize four newly appointed faculty members to the medical physics program. Wecome aboard!

Rui Zhang, PhD, DABR
Assistant Professor – tenure track (beginning August 2015)

Dr. Rui Zhang will join the Department of Physics & Astronomy in August 2015. He obtained his PhD in medical physics from The University of Texas MD Anderson Cancer Center in 2011, after which he joined Mary Bird Perkins Cancer Center. He received board certification in 2014 and has actively participated in the academic program. In the last two years, he served on the advisory committees for two MS students and served as major professor to two additional students who recently graduated. He currently serves as major professor to MS students David Heins and Nick Peterson. His teaching and scholarly activities include serving as course director of MEDP-7331 (Radiation Therapy) and teaching in MEDP-7992 (Introduction to Research) and MEDP-7121 (Radiobiology).



Owen Carmichael, PhD
Associate Professor - Adjunct

Dr. Owen Carmichael is the director of the imaging center at Pennington Biomedical Research Center. His research focuses on MR imaging, image processing, and imaging applications in research for nutrition, diabetes, and other areas; Dr. Carmichael is actively collaborating with Guang Jia. A new collaboration for brown fat research is under development with Les Butler (chemistry), Kip Matthews, and Carol Hirschmugl (Univ. Wisconsin Milwaukee). Dr. Carmichael is a supervisory committee member for Hatim Chafi (MS student) and Ryan Schurr (MS student).

Steve Lokitz, PhD
Associate Professor – Adjunct
(Photo Not Available)

Dr. Steve Lokitz is the director of imaging sciences and radiation safety officer at the Biomedical Research Foundation of Northwest Louisiana. He participated as an instructor in the Health Physics Society 2014 Professional Development School held at LSU in February 2014. He is an instructor in a Radiology Residents Physics Board preparation course for LSUHSC-NO. In summer 2014, he served as a co-instructor for a new course, MEDP-7992 (Health Physics Practicum), which provided intensive practical instruction on radiation protection in a cyclotron facility.

Charles Wood, MD
Assistant Professor – Adjunct

Dr. Charles Wood, MD, teaches in MEDP-7210 (Clinical Principles in Radiation Therapy); he will become course director starting spring 2016. Dr. Wood will be assuming the reigns from Dr. Sheldon Johnson, who has served as course director for many years.

Featured Article:
University team uses Bella Bowman Foundation funding for cancer research

The excitement of unwrapping gifts on Christmas Day was overshadowed for Trey Bowman and his family in 2010, after realizing there was something wrong with their seven-year-old daughter, Bella.

After rushing to the emergency room where doctors ran tests, Bella was diagnosed with an ependymoma brain tumor on New Year's Day.

The doctors immediately removed the tumor, and the Bowmans travelled to St. Jude's Children's Research Hospital in Memphis, Tennessee, to begin Bella's radiation therapy.

"Children with this type of cancer usually receive this course of treatment — radiation after the surgery," Trey said. "So we went to St. Jude's and ultimately to Jacksonville, Florida, where Bella received proton radiation. She did quite well through the treatment, and even shortly after the treatment, everything was great."

Bella and her family returned to their Baton Rouge home in summer 2011.

For the first few months, Bella stayed healthy, but an unexpected side effect took her back to St. Jude's.

"[The doctors] found tissue necrosis inside her brain stem, which is inoperable," Trey said. "Basically the radiation was working, but it was working too well. It was killing the healthy tissue that it shouldn't have been."

After 60 rounds of hyperbaric oxygen treatment — intended to stop and hopefully revert the necrosis — as well as two chemotherapy treatments, the Bowmans decided to drive home for the holidays on Dec. 15, 2011.

Bella showed symptoms during the drive back to Baton Rouge and was taken to Our Lady of the Lake Children's Hospital. She died on Dec. 23, 2011, at the age of eight.

From the moment Bella was diagnosed, Trey said he and his wife, Kim, were inspired by the support they saw from members of their community. A few weeks after Bella died, they decided to turn that inspiration into action by starting the Bella Bowman Foundation.

The foundation's commitment to research led to a collaboration with Wayne Newhauser, LSU medical physics professor and director of medical physics and health physics, who, in partnership with the Mary Bird Perkins Cancer Center, was given a $75,000 research grant to look at the risks of radiation therapy for cancer patients in fall 2014.

"This is actually the second grant the Bella Bowman Foundation has awarded to us. The first was a seed grant to commence preliminary research on the several possible causes of radiation necrosis in 2012," Newhauser said. "That study, which was completed last year, yielded results that helped set the direction of the current study, which will continue through 2017."

Newhauser enlisted medical physics PhD students Christopher Schneider, Lydia Wilson, and William Donahue, as well as physics graduate student Andrew Halloran, to contribute to the research with projects for their degrees.

"We're simultaneously pushing the frontier of knowledge in several different areas. We have very bright young minds who are making a difference through the research they perform as part of their graduate training," Newhauser said. "It's our long-term goal to find ways to prevent radiation necrosis from taking another life."

Schneider works on testing, developing and refining the radiation dose calculation algorithms — looking at how much radiation treatment is administered by the machine — in both X-ray radiation therapy and proton radiation therapy.

Halloran is applying 3-D printing technology to the research by printing what Newhauser calls "plastic phantom" replicas of patients. These phantoms possess the exact same anatomical structure as a patient's disease, so Halloran can test different radiation treatment measurements without harming the actual patient.

Wilson, who collaborated by testing X-ray radiation treatment algorithms as a graduate student, and Donahue, who created a prototype database for necrosis cases as a graduate student, recently began their PhD programs and are in the process of developing projects for their doctorates on the topic.

"Working with this group of people who all have projects that will come together to eventually make one solution for predicting, preventing or managing [radiation] necrosis is a great place for us to start a career," Donahue said. "The fact this affected someone who directly reached out to Dr. Newhauser and asked him to do this research is actually one of the reasons I decided to work with him, because this research is an area of interest for me and my future, and it's an area of growing interest nationwide."

Trey credits Bella with steering him in the right direction when looking for prospective scientists.

"I thought I was going to have to go to New York, Los Angeles, or the West Coast to find this team or person that would be willing to take on this research and have the experience to be able to take on this research, and as it turns out, he's one exit down from my house." Trey said. "We're very fortunate to have found Wayne Newhauser."

The Bella Bowman Foundation works to fund research on pediatric radiation treatment, to educate medical staffs on the different types of pediatric brain cancer, and to provide comfort care for families in need.

Article from:
The Daily Reveille March 4, 2015
http://www.lsureveille.com/daily/university-team-uses-bella-bowman-foundation-funding-for-cancer-research/article_e83047ca-c2c7-11e4-aa9a-6bf5206cef74.html?mode=story

New Publications in 2015

Thanks to the dedication and teamwork of our faculty and their trainees, 2015 is shaping up to be another record year for publications. Below you will find a list of some of the papers published to date.

Eley JG, Newhauser WD, Richter D, Lüchtenborg R, Saito N, Bert C. Robustness of target dose coverage to motion uncertainties for scanned carbon ion beam tracking therapy of moving tumors. Phys. Med. Biol. 60:1717-40, 2015. http://stacks.iop.org/0031-9155/60/1717

Taddei PJ, Khater N, Zhang R, Geara FB, Mahajan A, Jalbout W, Pérez-Andújar A, Youssef B, Newhauser WD. Inter-institutional comparison of personalized risk assessments for second malignant neoplasms for a 13-year-old girl receiving proton versus photon craniospinal irradiation. Cancers 7, 407-426 (2015) doi:10.3390/cancers7010407.

Eley J, Newhauser W, Homann K, Howell R, Durante M, Bert C. Implementation of an analytical model for neutron equivalent dose in a proton radiotherapy treatment planning system. Cancers 7, 427-438 (2015); doi:10.3390/cancers7010427.

Newhauser and Zhang, The physics of proton therapy. Phys. Med Biol. 60 R155.

Freund D, Zhang R, Sanders M, and Newhauser W. Predictive Risk of Radiation Induced Cerebral Necrosis in Pediatric Brain Cancer Patients after VMAT Versus Proton Therapy. Cancers 2015, 7, 617-630; doi:10.3390/cancers7020617.

Newhauser, Jones, Giebeler, Zhang, Taddei, Stewart, Vassiliev, and Lee. Reducing the Cost of Proton Therapy: The feasibility of a streamlined treatment technique for prostate cancer. Cancers, 2015, 7, 688-705; doi:10.3390/cancers7020688.

Rechner L, Zhang R, Eley J, Howell R, Mirkovic D, Newhauser WD. Minimization of the incidence of radiogenic second cancers with risk-optimized proton therapy, Phys Med Biol, at press.

Wilson, L. and Newhauser, WD, A simple and fast analytical method to calculate dose to the whole body from megavoltage external beam x-ray therapy. Submitted in Oct. to PMB, at press.

Zhang R., Mirkovic, D., and Newhauser, WD. Radiogenic second cancer risk calculation and visualization. Radiat Oncol 10 107 2015

Schneider C. Newhauser WD, Farah J. An analytical model of leakage neutron equivalent dose for passively-scattered proton therapy and validation with measurements. Cancers. Cancers 7, 795-810 (2015)

ABR Certification

We would like to congratulate our former students/colleagues on passing Part 3 of the ABR Certification exam in Therapeutic Medical Physics.

- Tom Brown
- Jeff Kemp
- Nels Knutson
- Matt Sutton
- Geoff Nichols
- Matt Roberts

They each took and passed the ABR oral exam in May 2015 and are now board-certified medical physicists.

Featured Article:
Mary Bird Perkins Medical Physicist included in LSU's Women in Science, Technology, Engineering, and Math

LSU's Women in STEM event was held on March 19, 2015, in the College of Art and Design Commons. Carol Colatrella, two-time Fulbright scholar and author of Toys and Tools in Pink: Cultural Narratives of Gender, Science, and Technology, was the keynote speaker. Colatrella presented a theoretical and practical understanding of gender inequality, race, and other forms of oppression in science, technology, engineering, and math (STEM) fields. Her talk aimed to increase awareness of these issues, improve the representation of women and minorities in STEM disciplines, and inspire campus initiatives connecting feminist theories and practices with positive outcomes. After the keynote address a reception followed, along with a panel discussion featuring prominent LSU STEM alumnae. Panelists included Rebecca Guidry, clinical medical physicist at Mary Bird Perkins Cancer Center; Dr. Karen Adler Storthz, professor emerita at the University of Texas Health Science Center in Houston; Pat Bodin, former chief information officer and vice president of global information for ExxonMobil; Judea Goins-Andrews, director of school engagement for Louisiana at Project Lead the Way's STEM focused curriculum; and Sorcha Clary, project engineer for Marathon Petroleum.

Article from College of Science website:
science.lsu.edu/files/item75703.html