



MEDICAL PHYSICS GRADUATE PROGRAM ALUMNI NEWSLETTER

July 2009

From the Program Director:

Greetings!

I can't believe it has been a year since the last issue of the newsletter was published. As you will see in this issue, the Program has continued to grow. The viability of the Program is due, of course, to the efforts of the faculty, staff, and current and former students. I would like to particularly thank George Starkschall, Deputy Program Director, and the members of the Program Steering Committee. In addition, the efforts of Georgeanne Moore and the support staff (Carla Stiggers, Elisa Mills, and Nikki Franklin) who contribute many hours to the Program are gratefully acknowledged.

I hope you enjoy this fourth issue of the newsletter, and please don't hesitate to let me or Georgeanne know if you have suggestions for future issues.

Please note that the Annual Alumni Luncheon will NOT be held at the Anaheim Meeting due to budget constraints and MDACC policies currently in effect. We will do everything we can to revive the luncheon next year!

Sincerely,
Ed Jackson

Recruitment Statistics for Admitted Trainees to the Medical Physics Program for the Last Ten Years:

Year	PhD Program	SMS Program
2000	2	1
2001	5	3
2002	5	4
2003	4	2
2004	4	2
2005	4	4
2006	6	5
2007	6	4
2008	10	8
2009	9	6

2009 Applicant Data for the Students Admitted to the Specialized Masters and PhD Programs:

Program	Verbal GRE	Quantitative GRE	Analytical GRE	GPA
SMS	542	748	4.0	3.4
PhD	614	772	4.6	3.6

Members of the Incoming Class for Fall 2008:

SMS in Medical Physics Program

Sarah Joy / University of Florida
Jonathan Mueller / University of Akron
Sina Najmaei / University of Texas - Austin
Emily Neubauer / Yale University
Paige Summers / Santa Clara University
Jackie Tonigan / University of New Mexico

PhD Program in Medical Physics

Joey Cheung / University of California - Berkeley
John Eley / Louisiana State University
Samuel Fahrenholtz / Kansas State University
Austin Faught / Kenyon College
Ryan Grant* / UT GSBS - Houston
Kenneth Homann* / UT GSBS - Houston
Jessica Nute / University of Virginia
Landon Wootton / University of Texas - Austin
Adam Yock / Harvard University

* Deferred admission until Spring 2010

Recent Graduates:

The following trainees completed their degree requirements in the 2008-09 academic year:

SMS in Medical Physics Program

- *Maria Bellon* -- Medical Physicist, Henry Ford Hospital
- *Jimmy Jones* -- Medical Physicist, The Methodist Hospital
- *Nathan Pung* -- Medical Physicist, St. Peter's Cancer Care Center
- *Yevgeny Vinogradskiy* -- Continuing on for his PhD

- **John Zullo** -- Medical Physicist, Advanced Radiation Physics Services, Inc.

(MS)PhD Program in Medical Physics

MS

- **Jaclyn Homnick** -- Medical Physicist, Kaiser Permanente

PhD

- **Michael Price** -- Academic Medical Physicist, Mary Bird Perkins Cancer Center, Radiation Physics
- **Jonas Fontenot** -- Academic Medical Physicist, Mary Bird Perkins Cancer Center
- **Malcolm Heard** -- Research Intern, MDACC Radiological Physics Center
- **Venkata Mogatadakala** -- Systems Engineer / GE Healthcare

Feedback from alumni is always welcomed by the Program! Please send all suggestions or comments to gmoore@mdanderson.org.

Honors and Awards During the 2008-09 Academic Year:

Jonas Fontenot (Mentor: Wayne Newhauser)

- ❖ Recipient of the 2008 Aaron Blanchard Award in Medical Physics

Venkata (Kishore) Mogatadakala (Mentor: Ponnada Narayana, PhD)

- ❖ UT Medical School Dean's Research Scholarship Award

Michael (Mitch) Price (Mentor: Firas Mourtada)

- ❖ 2nd place winner, John A. Cameron Young Investigators Symposium, AAPM 2008 (pictured below)



Adam Riegel (Mentor: Tinsu Pan)

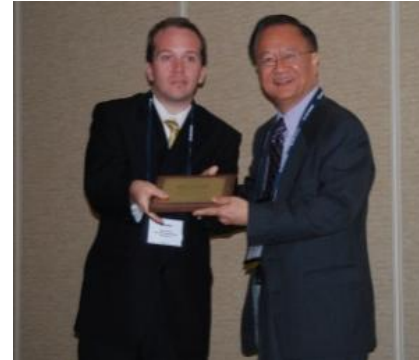
- ❖ 2009 Presidents' Research Scholarship Award

Sarah Scarboro (Mentor: Rebecca Howell)

- ❖ 2nd place winner of the SW-AAPM Young Investigators Competition

Brian Taylor (Mentor: R. Jason Stafford)

- ❖ Recipient of the 2009 ACMP Graduate Student Award (pictured below)



Jenia Vinogradskiy (Mentor: George Starkschall)

- ❖ 2nd place winner of the SW-AAPM Young Investigators Competition

Robert J. Shalek Fundraiser 10th Biennial Fundraiser

Sixty-four M.S. and Ph.D. students have been supported by fellowships to date. In the current fundraising cycle, we have received \$15,650 from 35 individuals, and \$18,000 from corporations and others for a total of \$33,650. The first round of letters for solicitation of donations for the 11th Biennial Fundraiser will be going out in September. If anyone has any questions on how to make a donation, they may contact Georgeanne Moore at (713) 563-2548 or by sending an email to: gmoore@mdanderson.org.

New Program Faculty 2009-10:

Clearly, the Program cannot succeed without the commitment of its faculty. We are happy to report that the following faculty members have recently joined our Program.

New Program Faculty

Ping Hou, PhD, Assistant Professor, Imaging Physics



Research Interests:

- MRI pulse sequence design and implementation
- Perfusion imaging
- Functional MRI
- General clinical applications of MRI
- MR procedure quality control

A. Kyle Jones, PhD, Instructor, Imaging Physics



Research Interests:

- Optimization of diagnostic imaging protocols (especially pediatrics) with regards to absorbed dose and image quality
- Phantom design and construction
- Radiation dosimeter design, construction, and testing
- Image quality assessment
- Image processing
- Computed tomography, computed radiography, digital radiography

Thomas Nishino, PhD, Assistant Professor, Imaging Physics



Research / Education Interests:

- Imaging processing
- Digital radiography/mammography
- Pedagogical methods for improving physics education

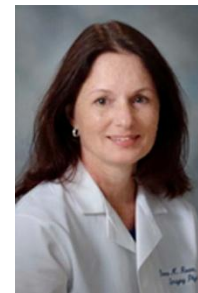
Jerimy Polf, PhD, Assistant Professor, Radiation Physics



Research Interests:

- Proton radiation therapy
- Radiation detection and measurement
- Monte Carlo simulation of radiation transport
- Computational physics
- Spectroscopy and spectral measurements
- Optical and semiconductor radiation detectors

Donna Reeve, MS, Sr. Medical Physicists, Imaging Physics



Research / Education Interests:

- Quality assurance testing for magnetic resonance imaging (MRI), mammography, computed tomography, and ultrasound.
- Use of medical images in radiation therapy treatment planning.
- Medical physics and MRI technologist education.

Yiping Shao, PhD, Associate Professor, Imaging Physics



Research Interests:

- Positron Emission Tomography
- Single Photon Emission Computed Tomography
- Nuclear imaging instrumentation and systems
- Multi-modality imaging
- Radionuclide imaging techniques for small animal studies

Annual UTMDACC Alumni Luncheon

This year has brought many challenges for the healthcare industry, with declines in patient revenues due to changes in payor mix and personal financial challenges and the value of investment portfolios dropping precipitously. The University of Texas M. D. Anderson Cancer Center was not spared the effects of these and other events and took aggressive action in April 2009 to reduce expenses. Like the alumni event at the annual AACR meeting, the Medical Physics Alumni Luncheon was cancelled for this year due to the financial constraints. The good news, however, is that the financial status of the institution is steadily improving and one of our goals in the coming fiscal year is to host the luncheon at the 2010 Annual AAPM Meeting in Philadelphia, PA. We hope to see you there!

Former Graduate Student and Current Assistant Professor in the Department of Imaging Physics at UTMDACC, Dr. R. Jason Stafford is highlighted in *The Messenger*. (Reprinted with permissions from *The Messenger*, The University of Texas M. D. Anderson Cancer Center)

Watching Tumors Die

Thursday, April 2, 2009

By Sarah Petrie

Above, from left: Kamran Ahrar, M.D., and R. Jason Stafford, Ph.D., discuss an upcoming spinal surgery that will use the Visualase technology. They'll be able to watch the tumor fully die in near real time during the procedure. Depending on where the tumor is located, the patient may or may not be awake during the procedure.

History books show that surgeons began removing cancerous tumors as early as the second century. Zoom ahead to 2009, take away the scalpels, scars and side effects that typically accompany surgery, and trade them for a tiny laser beam that zaps cancer dead on the spot. It sounds like science fiction, but our researchers and clinicians are among the first in the nation to investigate a new procedure that does just this ... and more.

“It’s called laser-induced thermal therapy, and the basic theory is that the laser heats the tumor to a certain temperature to kill it,” explains Jeffrey Weinberg, M.D., associate professor in Neurosurgery, who’s conducting a clinical trial to test the effectiveness of this procedure on patients with metastatic brain tumors.

How hot is too hot for a cancerous tumor? Sixty degrees Celsius, in most cases.

“The clinical trial targets patients with otherwise inoperable tumors or those for whom other treatments failed,” Weinberg says. “This is possible because tissues surrounding the tumor aren’t harmed or affected with this procedure — an advantage over other types of brain surgeries for cancer, including radiosurgery.”

Delivering laser energy using a device only millimeters in diameter, the procedure leaves a scar no bigger than your thumb. Plus, there should be no side effects for this less-invasive surgery, which takes only a few hours from start to finish. “The

laser portion should only take a few minutes, and patients will experience no swelling and little pain,” Weinberg adds.

Other forms of what also is known as ablation therapy already are in practice, killing tumors using heat, cold or electricity. So what makes this particular procedure so revolutionary? The physician actually watches the tumor die in real time, according to Kamran Ahrar, M.D., associate professor in Interventional Radiology, who has performed the procedure on a few patients with bone and spinal tumors as part of a similar clinical trial.

Weinberg agrees this is the biggest advantage of this method over other forms of treatment. “Patients don’t have to wait weeks or months for tests to confirm if the entire tumor is gone, as is the case with most surgeries. Instead, using this technology, we can convert magnetic resonance imaging into a color picture that indicates the temperature of the tissue,” he says. “This allows us to know exactly when the tumor is hot enough to fully die.”

How does it work?

Houston-based company Visualase Inc., which sells the technology, approached M. D. Anderson in 2000 for help with developing the tool. “For this procedure to be successful, the doctors must know the precise location and distribution of temperature in the tumor and that’s where the physicists come in the picture,” explains R. Jason Stafford, Ph.D., assistant professor in Imaging Physics, and lead consultant on the Visualase technology development for M. D. Anderson.

In other words, a stereotactic navigation system, “like a GPS for your brain” as Weinberg puts it, pinpoints the exact location and size of the tumor. After the surgeon drills a hole and sends the specially designed fiber directly to the tumor, the laser is activated, thus heating the tumor. Doing it in the MRI allows clinicians to monitor temperatures within the tissue. “Temperature as well as predicted regions of complete treatment are color-coded on a screen, giving us the ability to adjust or retreat a certain area, as needed,” Stafford adds.

And at M. D. Anderson, this entire procedure can be performed in one room, unlike at other institutions

that also are researching the procedure. We have a dedicated intra-operative MRI suite, which is safer for patients than moving them to different locations to complete the procedure.

Helping One Patient at a Time

Only a few other hospitals in the United States currently use the technology, which is approved by the Food and Drug Administration and has been successfully tested at M. D. Anderson in animal studies.

Other promising research in Paris shows that more than a dozen patients who have had the procedure haven’t seen any re-growth of tumors in those areas where the Visualase System has been used.

Weinberg is confident in the long-term potential of the procedure. Once candidates are identified, I expect there to be a few studies here each month.



GSBS Medical Physics Program Trainee Presentation Information for the Upcoming AAPM Meeting in Anaheim CA

Sunday, July 26, 2009 Joint Imaging/Therapy MOderated Poster Discussion 2:15 – 3:00 PM, Exhibit Hall – Area 3	
Adam Melancon (SU-EE-A3-4)	In vivo Detection of the Anterior Wall Using a Scintillation Fluid-Filled Rectal Balloon for Prostate Cancer Radiotherapy
Sunday, July 26, 2009 Imaging General Poster Discussion – Imaging 3:00 – 4:30 PM, Exhibit Hall	
Katie Hulme (SU-FF1-9)	Quantitative Image Quality Assessment of High-Dose CT Images Simulated by Averaging Multiple Low-Dose CT Images for Prospective CT Dose Reduction Studies
Triston Dougall (SU-FF-I-159)	Conditions for Practical Measurement of X-Ray Spectra for Clinical Radiography of the Chest
Sunday, July 26, 2009 Joint Imaging/Therapy General Poster Discussion 3:00 – 4:30 PM, Exhibit Hall	
Blake Cannon (SU-FF-J-131)	Improving Quantitation in Serial PET/CT with Improved Image Registration and Intra-Patient Metabolic Correction
Adam Riegel (SU-FF-J-175)	Segmentation of Moving Targets in PET: Threshold Dependence on

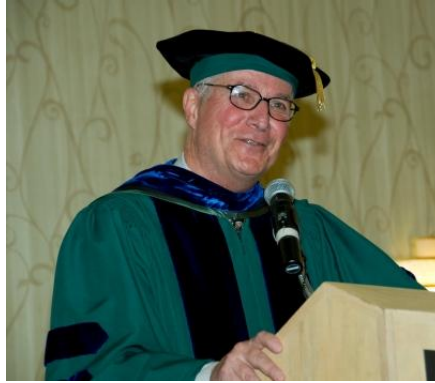
	Lesion Size, Motion, Extent, and Signal-to-Background
Sunday, July 26, 2009 Therapy General Poster Discussion 3:00 – 4:30 PM, Exhibit Hall	
Zhiqian (Henry) Yu (SU-FF-T-54)	Quantification of CT Artifact Reduction of Second Generation Intracavitary Brachytherapy Applicator
Yoshi Tsunashima (SU-FF-T-132)	Efficiency of Respiratory-Gated Synchrotron Based Scanning Beam Delivery of Proton Therapy for Lung
Daniel Robertson (SU-FF-T-150)	Optimizing Spot Spacing and Margin for Intensity Modulated Proton Therapy Planning
Sarah Scarboro (SU-FF-T-262)	Impact of Stomach Size and Position On Out-of-Field Organ Dose
Georgi Georgiev (SU-FF-T-269)	Comparison of Out-of-Field Doses in Pediatric Patients from Craniospinal Irradiations using Photon, Electron and Proton Spinal Fields
Zhiqian (Henry) Yu (SU-FF-T-302)	Response of One Dose TM and TLD100 Dosimeters Over 6 MV to Pd-103 Equivalent Energies
Ryan Grant (SU-FF-T-370)	Evaluation of an Anthropomorphic Pelvis Phantom for Proton
Scott Davidson (SU-FF-T-444)	Validation and Benchmark of a Source Model for a Varian 6 MV Photon Beam using Monte Carlo Calculations
Douglas Caruthers (SU-FF-T-554)	Commissioning a New Anthropomorphic Spine and Lung Phantom to Be Used for Remote Dose Verification of Spine Radiosurgery
Annelise Giebeler (SU-FF-T-625)	Estimation of Uncertainty for the Patient and Compensator Scatter Correction Factor in Proton Therapy D/MU Calculations
Monday, July 27, 2009 Imaging Moderated Poster Session: MRI and Image Processing 4:00 – 4:45 PM, Exhibit Hall – Area 4	
Ryan Bosca (MO-EE-A4-1)	Stability of T1 Relaxation Time and DCE-MRI Measures
Monday, July 27, 2009 Therapy Moderated Poster Session: Monte Carlo and General 4:00 – 4:45 PM, Exhibit Hall – Area 2	
Rui Zhang (MO-EE-A2-4)	Calculation of Water Equivalent Thicknesses of Materials of Arbitrary Densities, Elemental Compositions and Thicknesses in Proton Radiotherapy
Monday, July 27, 2009 Therapy Moderated Poster Session: Treatment	

Planning II and Stereotactic 4:45 -5:30 PM, Exhibit Hall – Area 2	
Jason Matney (MO-FF-A2-3)	Is Average CT a Good Estimate of Mid-Ventilation Position of Surrounding Normal Structures for Proton Therapy Treatment Planning of Lung Tumors?
Tuesday, July 28, 2009 Joint Imaging/Therapy Scientific Session: Modeling of Intrafraction Motion 10:00 AM – 12:00 Noon, Room 303A	
Yevgeney Vinogradskiy (TU-C-303A-1)	Evaluating the Accuracy of Four-Dimensional Photon Dose Calculations with Phantom Measurements
Wednesday, July 29, 2009 Therapy Scientific Session: Treatment Planning and Sterotactic I 10:00 – 12:00 Noon, Ballroom B	
Ming Yang (WE-C-BRB-1)	In Vivo Measurement of Proton Stopping Power Ratios in Patients Using Dual Energy Computed Tomography
Wednesday, July 29, 2009 Therapy Scientific Session: Brachytherapy	
Justin Mikell (WE-D-BRB-2)	Comparing a Grid-Based Boltzmann Solver with Monte Carlo Simulation for Voxel-Based Therapeutic Radionuclide Dose Calculations
Wednesday, July 29, 2009 Therapy Scientific Session: IMRT II 4:00 – 5:30 PM, Ballroom B	
Yoshi Tsunashima (WE-E-BRB-3)	Precision of Respiratory-Gated Delivery of Synchrotron-Based Proton Therapy

Selected 2009 GSBS Graduation Highlights



Dr. Weiner welcoming graduates



Dr. Stancel welcomes families and graduates



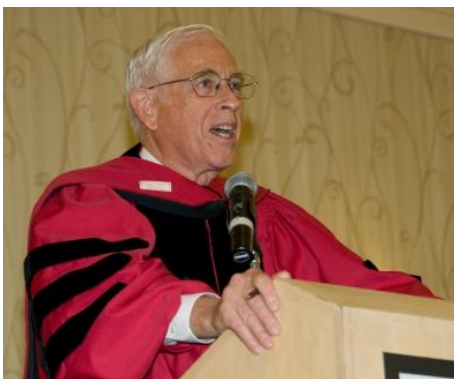
Dr. Michael Zigmond, Keynote Speaker



Faculty awaiting ceremony to begin



Graduates awaiting ceremony to begin



UTMDACC, President, Dr. John Mendelsohn during his welcome address



UT-HSC President, Dr. Larry Kaiser during his welcome address



Dr. Vicky Estrera, GSBS Alumni Association President



Jonas Fontenot receives his PhD Degree in Medical Physics



Malcolm Heard receives his PhD Degree in Medical Physics



Venkata Mogatakatadala receives his PhD Degree in Medical Physics

Our sincere thanks to our alumni, current students, faculty, and staff for another successful year for the Medical Physics Program!

Medical Physics Student Retreat

On Friday, June 26, 2009, the inaugural Medical Physics Program Graduate Student Research Retreat was held. The retreat was funded by the M.D. Anderson Cancer Center Graduate Education Committee (GEC), with the support of the Executive Vice President and Provost, Dr. Raymond DuBois. The goal of the retreat was to encourage program students to organize a day-long retreat that would allow them to exchange information about their individual research projects and to interact with an external leader in the field. This first retreat was organized by current and former Student-Faculty Liaisons, Yevgeney (Jenia) Vinogradskiy, Adam Riegel, and Brian Taylor.

Thirty-three students participated in the retreat, which, at the students' request, did not involve MDACC/UTHSC-H faculty. The invited speaker and retreat facilitator was Dr. Bill Hendee, current editor of *Medical Physics* and internationally recognized as a leader in the field of medical physics. The retreat was comprised of 14 student presentations and a talk by Dr. Hendee titled "Research Opportunities and Challenges in Medical Physics." Each student presentation as well as Dr. Hendee's address inspired vigorous discussion among the students.

The feedback from the students and from Dr. Hendee was overwhelmingly positive and both parties felt this was a great learning experience for the students and should be repeated next year. The Program will pursue funding for such a follow-up retreat through the GEC, and gratefully acknowledges the support of the GEC and Dr. DuBois for funding of this year's inaugural retreat.





Dr. Bill Hendee talking about challenges and opportunities in medical physics.

2009 Highlights from the Department of Imaging Physics

New Personnel

Faculty

Thomas Nishino, Ph.D., Assistant Professor,
Section of Radiological Physics

Kathryn Peek, PhD, Associate Professor,
Biomedical Engineering

Classified Positions

Colby Anger, B.S., Physics Technologist

Emmanuel Afowowe, B.S., Mgr. Scientific
Computing Resources, Image Processing and
Visualization Lab (IPVL)

Allan K. Lan, PhD, Sr. Research Scientist, Digital
Imaging Research Lab (DIRL)

Joseph Meier, BS, Physics Technologist

Guozhi Tao, PhD, Research Scientist, IPVL

Kimberly Young, Sr. Administrative Assistant
May Wu, MD, Education Coordinator, BME

Research Updates

Funded Grants:

- NIH/NCI – P50CA083639-08 (PI: Bast, Development grant: Bankson) : SPORE in Ovarian Cancer: Novel in-vivo imaging of tumor vascular structure and function in pre-clinical models of ovarian cancer, 7/01/08 – 6/30/10, \$50,000
- NIH/NCI – P30CA016672-33 (PI: Mendelsohn; Core director - Hazle), Cancer Center Support Grant: Small Animal Imaging Facility, 7/01/08 – 6/30/13, \$802,095
- GE – SR2008-00023792EB (PI: Mawlawi): Motion Correction of PET Data using Amplitude Gating,

2/02/08 – 12/31/08, \$46,003

- GE – SR2008-00024088EB (PI: Pan): Evaluation of Helical CT and Average CT in PET/CT Simulation of the Lung Cancer Patients, 4/1/07 – 4/30/08, \$28,416
- MDA-IRG (PI: Shao): Multi-animal simultaneous PET-MR imaging , 7/01/08 – 6/30/09, \$50,000
- NIH/NCI – R21EB007581 (PI: Shao): SSPM Based PET Detector Modules for Breast Imaging, 9/15/08 – 08/31/10, \$275,000
- NIH/NCI – R21/33CA124585-01 (PI: Shaw): A dual-resolution cone beam CT system for 3-D breast imaging, 09/01/2007 – 08/31/2011, \$1,094,580
- NIST/ATP – 70NANB7H7030 (Subcontract PI:

Shaw): Flat Panel X-Ray Sources, 2/12/08 – 10/31/09, \$136,775

- NIH/NCI – R21CA135315-01 (PI: Sokolov): Aptamer-siRNA chimera/nanoparticle conjugates for MRI guided cancer therapy, 7/1/08 – 6/30/10, \$291,534
- NIH/NCI – R01EB008101-01 (PI: Sokolov): Acoustic imaging of sentinel node metastasis using plasmonic nanosensors, 9/01/07 – 5/31/11, \$81,507
- Covidien – LS2008-00023708LG (PI: Stafford): TVT colon tumor model, 7/01/08 – 6/30/09, \$74,482

The Department of Imaging Physics received \$1,768,316 of extramural funding for research in FY08.

2009 Highlights from the Department of Radiation Physics

Honors and Awards

- Top 10 most-cited papers published in Physics in Medicine and Biology in 2007 and 2008 – **Newhauser W, Fontenot J, Zheng Y, Polf J, Titt U, Koch N, Zhang X, Mohan R.** “Monte Carlo simulations for configuring and testing an analytical treatment planning system.”; and **Zheng Y, Newhauser W, Fontenot J, Taddei P, Mohan R.** “Monte Carlo study of neutron equivalent during passive scattering proton therapy.”
- The 2008 Unfors Award of Excellence for the Best Radiation Measurement Article in the JACMP – **Briere T, Tailor R, Tolani N, Prado K, Lane R, Woo S, Ha C, Gillin M, Beddar S.** “Patient dosimetry for total body irradiation using single-use MOSFET detectors.”
- U.S. Patents – **Firas Mourtada**, Patricia Eifel, Aniju Jingram – Adaptive Intracavitary GYN Brachytherapy Applicator; and **Firas Mourtada** – Automated System for Formulating.
- Provisional Patents – **Sam Beddar, Tina Briere, Louis Archambault** – Real time in vivo Dosimetry Using Scintillation Detectors; and **Sam Beddar, Falk Poenisch, Louis Archambault, Michael Gillin, Radhe Mohan** – Real-time 3D Dosimetry Using Liquid Scintillators for Radiation Therapy.

- License Agreement – **Sam Beddar** – Scintillating Fiber Dosimeter Array.
- Selected for Physics in Medicine & Biology Highlights of 2008 Collection (represents the very best work published in the journal based on high praise from referees, the greatest number of online downloads, and the outstanding nature of the research presented – **Titt U, Zheng Y, Vassiliev ON, Newhauser WD.** “Monte Carlo investigation of collimator scatter of proton-therapy beams produced using the passive scattering method.”
- **Tina Briere, Chester Wang and Oleg Vassiliev** – passed ABR boards.

New Personnel

New faculty since the last AAPM meeting:

- **Robert Gastorf, M.S.** – Sr. Medical Physicist
- **Patrick Stafford, Ph.D.** – Assistant Professor

Promotions:

- **Peter Balter, Ph.D.** – Associate Professor
- **Tina Briere, Ph.D.** – Assistant Professor
- **Rajat Kudchadker, Ph.D.** – Associate Professor
- **Firas Mourtada, Ph.D.** – Associate Professor
- **Wayne Newhauser, Ph.D.** – Associate Professor
- **Catherine Wang, Ph.D.** – Assistant Professor

Major Clinical Accomplishments

- More than 1,000 patients treated with protons in over 3 years of operation.
- 16 slice CT on rails installed in ACB 5
- 16 slice CT on rails installed in the 2107 room
- Practice is now completely paperless and filmless.
- Gamma Knife first patients - June 2009
- Vision RT first patients - June 2009

Major Achievements in Radiation Physics Research

- More than 178 peer-reviewed publications since January 2008 (includes in-press)
- NIH/NCR RO1 (PI: Sam Beddar, PhD) Real-time In-vivo Dosimetry in Radiation Therapy Using Scintillation Detectors.
- NIH/NCI R21 (PI: Mark Harvey, PhD) Secondary Neutron Exposures in Pediatric Proton Radiotherapy.
- Sixel Technologies (PI: Stephen Kry, Ph.D.) Phantom Measurements and Validation of High Dose DVS.
- Transpire (PI: Firas Mourtada, Ph.D.) Deterministic Radiotherapy Dose Calculation Method.
- Northern Illinois University (PI: Wayne Newhauser, Ph.D.) Investigation of Dosimetry and Late Effects of Receiving Proton Beam Therapy.
- Slane Company (PI: Wayne Newhauser, Ph.D.) Radiation Shielding for a Proton and Heavy Ion Cancer Therapy Facility.
- NIH/NCI K01 (PI: Rebecca Howell, Ph.D.) Improving Effectiveness and Accuracy of Radiation Therapy
- NIH/NCI P01 (jointly led by Drs. Radhe Mohan and Thomas DeLaney (MGH)) Optimizing Proton Radiation Therapy – joint grant with Massachusetts General Hospital and U.T. M.D. Anderson Cancer Center

Radiological Physics Center

Section of Outreach Physics

Radiological Physics Center

- Principal Investigator: Geoff Ibbott, 0.63, Radiological Physics Center, CA 10953, 2005-2010, \$15,893,032 (\$3,614,839/year includes program income generated under the Additional Cost Alternative)
- Principal Investigator: Geoff Ibbott, 5%, Advanced Technology Radiation Therapy Quality Assurance Review Consortium, 2 U24 CA081647, Washington University, 7/1/2007–6/30/2012, \$409,901 (\$81,980/year)
- 1,641 active institutions now being monitored, including 33 in Canada and 100 elsewhere in the world. RPC phantoms have been irradiated successfully by more than 580 institutions for IMRT and SBRT protocols. Our experience still shows that about 1/4 of institutions fail to irradiate the IMRT H&N phantom according to their own treatment plans. The RPC recently began auditing proton facilities. Six clinical sites have irradiated TLD (including one in Japan) and a visit has been conducted to one site.

Other projects within the RPC

RPC staff and students are presenting their work on the following topics at this meeting. Most projects are collaborations with staff or faculty in the Departments of Radiation Physics and Diagnostic Imaging Physics; at Washington University, UT Southwestern Medical Center, Duke University Medical Center, UT San Antonio, LA Children's Hospital; or at several industrial partners:

- **“Response of OneDose™ and TLD100 Dosimeters Over 6MV to Pd-103 Equivalent Energies.” Z Yu, R Taylor, G Ibbott, N Wells, K Prado**
- **“The Radiological Physics Center’s Annual TLD Machine Calibration Audit and Its Impact On Clinical Trials,” D Followill, J Lowenstein, L Palmer, G Ibbott**
- **“Optically Stimulated Light Dosimetry: Commissioning of An Optically Stimulated Luminescence (OSL) System for Remote Dosimetry Audits, the Radiological Physics Center Experience,” J Aguirre, P Alvarez, D Followill, G Ibbott, C Amador, A Taylor**

- ”Evaluation of a PAGAT Gel for Use in An Anthropomorphic Phantom.” **M Heard, G Ibbott, D Followill, E Jackson, M Salehpour, A White**
- “Validation and Benchmark of a Source Model for a Varian 6 MV Photon Beam Using Monte Carlo Calculations.” **S Davidson, J Cui, S Kry, M Vicic, J Deasy, R White, G Ibbott, D Followill**
- “Evaluation of An Anthropomorphic Pelvis Phantom for Proton Therapy.” **R Grant, G Ibbott, N Sahoo, S Tucker, X Zhu, D Followill**
- ”Evaluation of An Anthropomorphic Pelvis Phantom for Proton Therapy.” **R Grant, G Ibbott, N Sahoo, S Tucker, X Zhu, D Followill**
- “Comparison of Out-Of-Field Doses in Pediatric Patients From Craniospinal Irradiations Using Photon, Electron and Proton Spinal Fields.” **G Georgiev, D Followill, G Ibbott, S Kry, J Fontenot, A White, A Mahajan**
- “Credentialing for Clinical Trials: The Role of the RPC.” **G Ibbott**
- “Estimate of the Uncertainty in Relative Secondary Cancer Risk Calculations Following Proton Therapy and Intensity Modulated X-Ray Therapy.” **J Fontenot, C Bloch, D Followill, U Titt, M Zhang, W Newhauser**
- “Evaluating the Accuracy of Four-Dimensional Photon Dose Calculations with Phantom.” **Measurements,” Y Vinogradskiy, P Balter, D Followill, P Alvarez, A White, G Starkschall**
- “Performance-Based QA for Radiotherapy: TG-135 - QA for Robotic Radiosurgery.” **S Dieterich, C Cavedon, C Chuang, A Cohen, J Garrett, C Lee, J Lowenstein, M D'Souza, D Taylor, X Wu, C Yu**
- “Requirements and Opportunities for Maintenance of Certification.” **G Ibbott, G Frey, R Morin, S Thomas**
- “Eye Plaque Dosimetry: Report of the AAPM Therapy Physics Committee Task Group No. 129.” **F Mourtada, S Chiu-Tsao, M Astrahan, P Finger, D Followill, A Meigooni, C Melhus, M Napolitano, R Thomson, M Rivard, M Parish, D Rogers, R Nath**

Accredited Dosimetry Calibration Laboratory (Geoffrey Ibbott)

- The MD Anderson ADCL successfully completed a reaccreditation site visit last year as required by our compliance with the AAPM accreditation program. The ADCL has acquired a number of new customers, and several customers returned this year after using a different lab.

Late Effects Group (Marilyn Stovall)

- Childhood Cancer Survivor Study (CCSS), St. Jude Children’s Research Hospital, 12/1/2006-11/30/2011 (NCI), \$2,368,944
- Genetic Consequences of Therapies for Childhood Cancer, International Epidemiology Institute, Ltd.(NCI), 9/12/2005-5/31/2010, \$105,200
- Support Services for Medical Radiation Dosimetry for Epidemiology Studies, (NCI), 4/15/2005 – 4/14/2010, \$1,869,540
- Breast Cancer, Radiation Exposure and the ATM Gene, Memorial Sloan Kettering (NCI), 4/1/2008 – 3/31/2013, \$415,683
- Heart Disease Following Cancer Treatments of Children and Young Adults, Vanderbilt University, 4/1/2009 - 3/31/2014, \$522,066, pending

Radiation Dosimetry Services (Marilyn Stovall)

- Over 1,000 active institutions. Services offered: check of machine output for photon and electron beams, check of absorbed dose for stereotactic radiosurgery, and check of blood irradiators. We have been processing checks of IMRT in collaboration with the Radiological Physics Center but these services will become totally controlled by them once a company center is established for them to handle the billing and receivables for these services.

Education (Starkschall)

Postdoctoral Fellows

- Since the last report, several postdoctoral fellows have completed their appointments and gone on to further their careers.
 - **Louis Archambault, PhD** (Beddar)

joined the staff of the Department of Radiation Physics as a Computational Scientist

- **Junfang Gao, PhD** (S Zhang/Mohan) entered the medical physics residency program at Scott and White Clinic
 - **Mark Harvey, PhD** (Newhauser) joined the faculty of the Department of Physics, Texas Southern University
 - **Xioaning Pan, PhD** (X Zhang) entered the medical physics residency program in the Department of Radiation Physics in 2009
 - **Falk Pönisch, PhD** (Beddar) entered the proton fellowship program in the Department of Radiation Physics
 - **Xioafei Song, PhD** (Shiu) entered the proton fellowship program in the Department of Radiation Physics
 - **Zhonglu Wang, PhD** (Salehpour) has taken on a clinical position in Fall River MA
- Several new fellows have joined the Department this past year:
 - **Aman Anand, PhD**, who received his PhD in Applied Physics from the University of North Texas, has joined Dr Gillin's group
 - **Luis Perles, PhD**, who received his PhD from the University of Sao Paolo, has joined Dr Titt's group
 - **Sharmalee Randaniya, PhD**, who received her PhD from the University of Houston in Nuclear Physics, has joined Dr Howell's group
 - **Lilie Wang, PhD**, who received her PhD in Medical Physics from Carleton University, has joined Dr Beddar's group on the graduate program's T-32 grant
 - **David Klein, PhD**, received a PhD in Physics from Oklahoma State University, and has joined Dr Beddar's group

We welcome all our new and returning postdoctoral fellows.

Medical Physics Residency Program

- Two of our residents are completing their

training this summer.

- **Melinda Chi, PhD**, will be joining a private medical physics consulting practice in the Houston area
- **Colleen Schinkel, PhD**, is still finalizing a position for this fall

We wish Drs Chi and Schinkel success in their careers, and all of our residents a rewarding training period

- Moving into the second year of their residency program are **Heng Li, PhD, Julianne Pollard, PhD, and Xin Wang, PhD.**
- Competition has increased for positions in our residency program. We had almost 40 applications for the two open residency positions this year.
- The Department welcomes the following two new residents into our program
 - **Heetak Cheung, PhD**, is receiving a PhD in Nuclear Engineering from the University of Florida
 - **Xioaning Pan, PhD**, completed a postdoctoral fellowship at MDACC

Proton Fellowship Program

We have begun a Proton Fellowship Program under the direction of Dr Narayan Sahoo. Two of our former postdoctoral fellows have entered the program, **Falk Pönisch, PhD, and Xioafei Song, PhD.** This program, to our knowledge, the first of its kind, is designed to provide specialized clinical training to physicist interested in proton radiation therapy. We wish our new fellows the very best of success in this pioneering effort.