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Dear Colleague,

The Department of Radiation Oncology was established at Jefferson in 1969 and flourished under the inaugural chair, Simon Kramer, MD. Dr. Kramer was also the founder of the Radiation Therapy Oncology Group (RTOG), now NRG Oncology, a national clinical cooperative group funded by the National Cancer Institute. Excellence and innovation continued under subsequent chairs Carl Mansfield, MD, and Walter J. Curran, Jr., MD. We proudly take this opportunity to share with you our recent clinical, academic, research, teaching and entrepreneurial accomplishments.

We provide patient-focused care in Center City Philadelphia and at our facilities throughout the city and suburbs. Our radiation oncology and medical physics residency training programs attract hundreds of applicants annually. We have established relationships with several medical schools in China and have hosted dozens of visiting international scholars. Our faculty are engaged in high-impact science projects focusing on basic, translational and clinical research designed to improve cancer care. We have created smartphone apps to gather patient-reported outcome data, use telemedicine for follow-up care and offer the latest in genomics for precision oncology. We are creating new tracks for education in entrepreneurship, digital health and design thinking.

Faculty in the Department of Radiation Oncology’s Medical Physics division have had a significant impact in research, defining roles for quality assurance and educating physics trainees over the past 50 years. Our medical physicists are leading departmental process improvements, tracking quality metrics, harmonizing best practices across the Jefferson brand, defining national accreditation standards for quality and safety and conducting advanced research in organ motion, machine learning and radiomics.

As leaders in quality and safety initiatives, we are pleased to be founding members of the American Society for Radiology Oncology’s Radiation Oncology Incident Learning System (RO-ILS) and achieving ASTRO’s designation as an Accreditation Program for Excellence (APEx).

Questions, comments and suggestions are most welcome.

Enjoy our publication!

Adam P. Dicker, M.D., Ph.D., FASTRO
Enterprise Senior Vice President and Chair, Radiation Oncology
Professor of Radiation Oncology, Pharmacology and Experimental Therapeutics
Sidney Kimmel Medical College at Thomas Jefferson University
The Department of Radiation Oncology has an international reputation for education in the field. From medical students to fellowship training to innovative education in medical physics, we take pride in fostering the development of tomorrow’s practitioners and researchers.
A unique opportunity for medical students. Third- and fourth-year medical students may elect clinical rotations in the Department of Radiation Oncology. The three-week third-year rotation introduces medical students to the specialty. “In many medical schools, third-year students don’t have this opportunity,” says medical student course director Mark Hurwitz, MD. “Jefferson is in the forefront of incorporating radiation oncology as an elective as part of the surgical clerkship rotation. Nearly all physicians encounter cancer patients and survivors, and this rotation gives students an appreciation for the oncologic aspect of these patients’ care.”

Fourth-year students who apply for a radiation oncology elective are typically interested in careers in this field, and we accept not only Jefferson students for this rotation, but also fourth-year student applicants from across the nation. During this four-week rotation, students participate in evaluating new patients and interacting with patients during on-treatment and follow-up visits. They attend multidisciplinary case conferences as well as all other educational opportunities provided for the radiation oncology residents. They rotate in clinic with various physicians and observe patients being treated with brachytherapy, conformal radiation therapy, GammaKnife, high dose radiation, hyperthermia, and other forms of therapy.

We welcome all medical students to participate in our various research projects. “First- and second-year medical students across the country are invited to apply for our Simon Kramer Externship in Radiation Oncology,” explained Eric Gressen, MD. This externship was established for the purpose of exposing medical students to the discipline of radiation oncology and provides up to two students each year with the opportunity to spend six weeks in our department working on a research project and participating in clinical and educational activities.
RADIATION ONCOLOGY RESIDENCY

Training the future leaders in our field
Jefferson’s residency program is an extremely competitive comprehensive four-year program that is accredited by the Accreditation Council for Graduate Medical Education (ACGME). Currently there are nine residents. Throughout their training, our residents work with leaders in clinical radiation oncology, medical physics, translational research and basic science. Residents become highly trained in modern radiotherapy techniques and procedures, including radiosurgery, image-guided radiotherapy, brachytherapy, radioisotopes, hyperthermia, total body irradiation and total skin electron beam therapy.

Jefferson residents are provided with three exceptional off-campus rotations:
• A pediatric radiation oncology rotation at St. Jude Children's Research Hospital in Memphis, Tenn.;
• A gynecologic and thyroid malignancies rotation at Washington University in St. Louis, Mo.;
• A stereotactic radiosurgery rotation with CyberKnife at Christiana Care in Newark, Del.

Our residency program will be incorporating aspects of design thinking into our curriculum. Design thinking is a powerful tool in health care to improve care delivery, train future physicians and improve the experience for both patients and providers.

Medical informatics is the intersection of information science, computer science and health care. It includes the disciplines of information science, computer science, social science, behavioral science, management science and others. The National Library of Medicine defines health informatics as “the interdisciplinary study of the design, development, adoption and application of IT-based innovations in healthcare services delivery, management and planning.”

Residents’ research projects have included studies at the U.S. Food and Drug Administration, creating tools to understand intricate magnetic resonance imaging, developing a lung cancer smartphone app, and working with textile experts to create garments that help decrease treatment toxicity and improve cure rates. Several pilot studies are also under way to evaluate patient engagement, electronic capturing of patient-reported outcomes and remote monitoring in at-risk patients with cancer. Another project will evaluate the feasibility of at-home blood pressure monitoring in patients with head and neck cancer who are receiving chemoradiotherapy. Another ongoing project is the prospective trial entitled Strength through Insight, which will evaluate the feasibility of electronic capture of patient-reported outcomes via validated measures in individuals with prostate cancer.

“Traditional paths were physician-scientist or physician-clinical researcher,” says department chair and residency program director Adam Dicker, MD, PhD. “Today we recognize additional paths, such as becoming a physician-entrepreneur or focusing on quality and safety. This range is what makes our program so attractive to tomorrow’s brightest scientists and physicians.”

To learn more about the Department of Radiation Oncology’s residency program, visit: http://www.jefferson.edu/university/jmc/departments/radiation_oncology/education/
MEDICAL PHYSICS RESIDENCY

Training the future leaders in our field
From the history of Marie Curie to modern radiation technology, physicists have always been important players in radiation oncology clinical practice, patient care and advancing research. Thomas Jefferson University’s Medical Physics Division of the Department of Radiation Oncology considers physics resident training one of the most important components of advancing the field.

The Medical Physics Division of Radiation Oncology has a long-standing history of educating medical physicists over the past 20 years that evolved into one of the first accredited residency programs in the country. Accreditation was achieved through the Commission on Accreditation for Medical Physics Education Programs (CAMPEP). The residency program was recently expanded to include the Helen F. Graham Cancer Center at Christiana Care Health System (CCHS) in Delaware. This expansion is mutually beneficial to both parties and provides enhanced opportunities for the training of new medical physicists. This new course has been spearheaded by the residency program director Amy Harrison, MS. The program has also appointed associate residency program directors at both centers to assist with the newly expanded programs. They are Taoran Li, PhD, at Jefferson, and Firas Mourtada, PhD, Christiana Care.

“Inter-professional and interdepartmental collaboration, as well as being a multi-vendor site, is what accentuates our trainees’ education and what sets Jefferson apart as a training institution. Residents’ relationships with our clinicians and clinician residents build lasting bonds and the professional infrastructure to support a lifelong career with peer support and review. Dynamic hands-on experience and training on the most technologically advanced systems from all vendors gives our residents an immediate appreciation of depth and breadth of the physics field,” says Ms. Harrison. Residents have rotations at our affiliate centers to experience diverse patient environments and to have practical experience with a broad scope of equipment from all manufacturers from classic applications to the most advanced technology available.

The medical physics residency is extremely competitive, with 120 applicants for three positions filled annually. “We seek applicants from all backgrounds who will strive to meet the Jefferson pillars of clinical patient care, education and research,” says Harrison. At the conclusion of the two-year residency program, the resident will be able to demonstrate competency in all areas of radiation oncology physics and will be prepared to sit for the examination of the American Board of Radiology in Therapeutic Radiology Physics.
In 2015, the Association of American Medical Colleges Faculty Forward survey revealed key needs of the Department’s faculty: better understanding of mentorship; improved financial literacy, improved skills for academic advancement and professional leadership skills. Shari Rudoler, MD, leads the Department’s faculty development program and created a two-year, six-part program to address those needs. Some of these sessions will be CME- and SAM-eligible (from the Sidney Kimmel Medical College and the American Board of Radiology respectively). When considering we have faculty both at the Bodine Center and at off-campus locations, Dr. Rudoler decided that these sessions would be held on a rotating basis at all of our facilities.

Topics mirror the survey-identified areas. For the first session at Aria Health, Torresdale Campus, Dimitrios Papanagnou, MD, MPH, RDMS, Jefferson’s assistant dean for faculty development, spoke on emotional intelligence and leadership. Future sessions will cover career trajectories, finance, teaching skills and quality and safety.

The future of faculty development
The Department of Radiation Oncology is a leader in providing this type of faculty education. Rudoler sees a future session on value-based reimbursement, new to oncology, as an opportunity to position the department to deliver still greater value. “We have pathways in cancer care, but every patient’s case is unique. This differs from orthopedics and other specialties where value-based payments are becoming the norm. Currently, Medicare has only one metric for radiation therapy in oncology.” Educated Jefferson faculty can help define additional metrics and shape care paths in a changing health care universe.
Jefferson Radiation Oncology’s International Fellowship Program offers training in radiation oncology, molecular radiation biology and medical physics. In recent years, fellows have come from Italy, Turkey, Israel, Singapore, Japan and China. Most applicants are seeking a research opportunity with educational activities and clinical observerships. At the program’s end, most fellows have a publishable manuscript. Every fellow has an assigned supervising faculty mentor who is always available as a resource.

Collaborations with China
In collaboration with investigators at West China University, we highlight here one of the collaborative projects to be presented at the 2017 American Association for Cancer Research annual meeting. This laboratory project investigated the potential pulmonary toxicities from thoracic therapy in combination with anti-PD1 immunotherapy and the underlying mechanisms in mouse models as the clinical data are being collected from ongoing and planned clinical trials of this combination among lung cancer patients.

Pneumonitis is a rare but potentially fatal toxicity from anti-PD1 immunotherapy. Thomas Jefferson University Hospital and West China Hospital launched a collaborative project to address whether anti-PD-1 mAbs potentiate radiation-induced lung toxicity and mortality in a murine model using a small animal radiation research (SARRP) platform that allows lung-targeting irradiation (LIR). We found that irradiated mouse lung tissues exhibited abnormal alveoli, with exudates and inflammatory cells in the alveolar septa during the acute phase (30 days following LIR). The extent of these changes was more prominent in the LIR+anti-PD-1 group. Moreover, there was a significant increase (2.1 fold, p<0.05) of CD8+ cytotoxic T lymphocytes in the irradiated lung tissues from the group over the control group. During the late phase (170 days following LIR), lung tissues exhibited more prominent changes consistent with damage, as well as fibrosis in the LIR+anti-PD-1 group per micro CT scans and the Masson’s trichrome staining for collagen deposits. More importantly, mice that received LIR with anti-PD-1 had significantly worse survival than mice getting LIR+IgG (17% vs. 47%, p=0.03).

These data indicate that anti-PD-1 potentiates radiation-induced lung injury and related mortality, likely through a CD8+ cell-mediated immune response. Currently, we are investigating the underlying mechanisms, which may lead to novel therapeutics that treat pulmonary toxicities from radiotherapy or immunotherapy. Our study suggests that caution should be taken for excessive lung toxicities in clinical trials combining thoracic RT and anti-PD-1 therapy. We will collaborate with NRG Oncology to further investigate clinical lung toxicities from combining thoracic radiotherapy with anti-PD-1 therapy in ongoing RTOG 3505 though analyzing the collected biospecimens.
PHYSICIANS

ADAM P. DICKER, MD, PhD, FASTRO
Professor of Radiation Oncology, Pharmacology and Experimental Therapeutics
Sidney Kimmel Medical College at Thomas Jefferson University
Senior Vice President and Chair, Enterprise Radiation Oncology

Dr. Dicker received his MD and PhD from Cornell University Medical College. He completed a surgical internship at Lenox Hill Hospital and a residency in radiation oncology at Memorial Sloan-Kettering Cancer Center. He is board certified in radiation oncology.

SUBSPECIALTY INTERESTS Prostate cancer, brain tumors, precision medicine, medical informatics, immunotherapy

RESEARCH AND OTHER INTERESTS Translational research, smartphone apps, patient-reported outcomes

JOINED TJEU 1996

PRAMILA RANI ANNE’, MD
Associate Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University
Director, Clinical Operations, Department of Radiation Oncology
Thomas Jefferson University Hospitals

Dr. Anne’ received her MD from the University of Virginia College of Medicine. She completed a transitional year internship at Riverside Medical Center and a residency in radiation oncology at Massachusetts General Hospital. She is board certified in radiation oncology.

SUBSPECIALTY INTERESTS Gastrointestinal, breast, head and neck, gynecologic and skin cancers

RESEARCH AND OTHER INTERESTS Clinical trials, reduction of radiation toxicity, brachytherapy

JOINED TJEU 1995

USHA BABARIA, MD
Clinical Assistant Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Babaria received her MD from Baroda Medical College, India. She did her residency in radiation oncology at Pittsburgh University Hospital and a fellowship at MD Anderson Cancer Center. She is board certified in radiation oncology.

SUBSPECIALTY INTERESTS Intensity modulated radiation therapy (IMRT), image-guided radiation therapy (IGRT), prostate cancer and breast cancer treatment

JOINED TJEU 2016
**VOICHITA BAR AD, MD**

Associate Professor of Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Bar Ad completed her residency in radiation oncology and medical oncology at Hebrew University – Hadassah Medical Center in Jerusalem, Israel, and a fellowship in radiation oncology at the University of Pennsylvania, Philadelphia. She is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Head and neck and gastrointestinal malignancies

**RESEARCH AND OTHER INTERESTS**  
Treatment-related toxicities for head and neck cancer patients, new immobilization devices for head and neck cancer treatment, hyperthermia and brachytherapy for brain and head and neck cancer.

**JOINED TJU** 2010

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**ROBERT B. DEN, MD**  

Associate Professor of Radiation Oncology,  
Cancer Biology and Urology  
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Den received his MD from Harvard Medical School. He did his internship at Massachusetts General Hospital and residency training in radiation oncology at Thomas Jefferson University. He is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Genitourinary and gynecologic malignancies, high dose rate brachytherapy, stereotactic body radiation therapy

**RESEARCH AND OTHER INTERESTS**  
Translational research; co-leader of multidisciplinary genitourinary oncology clinic

**JOINED TJU** 2007

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**JESSIE DINOME, MD**

Clinical Assistant Professor of Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University  
Medical Director, Jefferson Radiation Oncology at Riddle Hospital

Dr. DiNome received her MD from the University of North Carolina – Chapel Hill. She completed a residency in radiation oncology at St. Vincent’s Hospital in New York, followed by a fellowship in breast radiation at the University of New York – Stoney Brook. She is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Breast, gastrointestinal, thoracic, head and neck, and skin malignancies

**RESEARCH AND OTHER INTERESTS**  
Skin cancer; brachytherapy treatment options, breast cancer fractionation options; long-term effects of irradiation.

**JOINED TJU** 2003

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**SCOT A. FISHER, DO**

Clinical Professor of Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University  
Vice Chair, Business Development and Director, Off-campus Programs, Department of Radiation Oncology  
Chairman of Radiation Oncology and Radiosurgery, Aria-Jefferson Health

Dr. Fisher received his DO from the Philadelphia College of Osteopathic Medicine. He did a residency and fellowship in radiation oncology at Hahmemann University Hospital. He is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Soft tissue sarcomas

**RESEARCH AND OTHER INTERESTS**  
Financial toxicity from radiation therapy and financial literacy in radiation oncology

**JOINED TJU** 2001
Dr. Gressen received his MD from Drexel University School of Medicine. He did a residency in radiation oncology at Thomas Jefferson University and is board certified in radiation oncology.

SUBSPECIALTY INTERESTS  Genitourinary and thoracic malignancies, image-guided radiation therapy, intensity-modulated radiation therapy, stereotactic (intracranial and extracranial/stereotactic body) radiosurgery.

RESEARCH AND OTHER INTERESTS  Medical history

JOINED TJU 1995

Dr. Hurwitz received his MD from Penn State University College of Medicine. He completed an internship at Greater Baltimore Medical Center and a radiation oncology residency at Johns Hopkins University. He is board certified in radiation oncology.

SUBSPECIALTY INTERESTS  Genitourinary oncology, sarcoma, gastrointestinal malignancies; thermal oncology

RESEARCH AND OTHER INTERESTS  Genitourinary oncology; thermal oncology

JOINED TJU 2012

Dr. Herbert received his BA in biology at the University of Pennsylvania and his MD from New York University. He completed a residency in radiation oncology at the University of Pennsylvania, and served as Chief Resident during his final year of training. He is board certified in radiation oncology.

SUBSPECIALTY INTERESTS  Breast cancer, soft tissue sarcoma

JOINED ABINGTON  1992

ABINGTON-JEFFERSON HEALTH  2016

Dr. Lu received his MD from Shanghai Medical University and his PhD in cell and molecular biology at Baylor College of Medicine. He completed his internship at the University of Pittsburgh and a radiation oncology residency at the University of Southern California School of Medicine.

SUBSPECIALTY INTERESTS  Lung cancer

RESEARCH AND OTHER INTERESTS  Immunotherapy, therapeutic resistance, cancer genomics

JOINED TJU  2011
KEITH MERITZ, MD  
Clinical Instructor in Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University  

Dr. Meritz received his MD from the Medical College of Pennsylvania. He completed a surgical internship at Albert Einstein Medical Center and a residency in radiation oncology at Beth Israel Medical Center. He is board certified in radiation oncology.  

SUBSPECIALTY INTERESTS  Prostate cancer  
RESEARCH AND OTHER INTERESTS  Clinical research protocols, evidence-based medicine  
JOINED TGU  2016  

WAYNE PINOVER, DO  
Clinical Associate Professor of Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University  
Attending Physician, Department of Radiation Oncology, Abington – Jefferson Health  

Dr. Pinover received his BS in chemistry at Dickinson College and his DO from the Philadelphia College of Osteopathic Medicine. He completed a residency in radiation oncology at Fox Chase Cancer Center and served as Chief Resident during his final year of training. He is board certified in radiation oncology.  

SUBSPECIALTY INTERESTS  Genitourinary, gynecologic and pancreatic malignancies  
JOINED ABINGTON  2001  
ABINGTON-JEFFERSON HEALTH  2016  

SHARI B. RUDOLER, MD  
Clinical Associate Professor of Radiation Oncology  
Sidney Kimmel Medical College at Thomas Jefferson University  
Director, Faculty Development, Department of Radiation Oncology  

Dr. Rudoler received her MD from the University of Pennsylvania School of Medicine, where she also completed a residency in radiation oncology. She completed a fellowship in neuro- oncology at Thomas Jefferson University Hospital. She is board certified in radiation oncology.  

SUBSPECIALTY INTERESTS  Breast cancer, central nervous system and orbital tumors, intracranial and extracranial stereotactic radiosurgery/stereotactic radiation therapy (SRS/SRT), and stereotactic body radiation therapy (SBRT), general radiation oncology.  
RESEARCH AND OTHER INTERESTS  Director, Faculty Development Leadership Series; multidisciplinary breast conference; multidisciplinary lung conference  
JOINED TGU  1998  

KENYIN SHI, MD, PhD  
Associate Professor of Radiation Oncology and Neurological Surgery  
Sidney Kimmel Medical College at Thomas Jefferson University  
Co-director, Jefferson Brain Tumor Center; Medical Director of Radiation Oncology at Jefferson Hospital for Neuroscience Thomas Jefferson University Hospitals  

Dr. Shi received his MD from Shanghai Medical University (now Shanghai Medical College, Fudan University) and his PhD from the University of Florida. He did a residency in radiation oncology at the University of Florida. He is board certified in radiation oncology.  

SUBSPECIALTY INTERESTS  Central nervous system malignancies, lymphoma, skin cancer, stereotactic radiosurgery.  
RESEARCH AND OTHER INTERESTS  Clinical trials, outcomes research, advanced technology in stereotactic radiosurgery  
JOINED TGU  2010
**NICOLE SIMONE, MD**  
*Margaret Q. Landenberger Associate Professor of Radiation Oncology*  
*Sidney Kimmel Medical College at Thomas Jefferson University*  
*Radiation Director, Jefferson Breast Care Center*  
*Thomas Jefferson University Hospitals*

Dr. Simone received her MD from the New Jersey Medical School – Rutgers University, where she also completed her internship. She did a residency in radiation oncology at the National Cancer Institute and is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Breast cancer, precision medicine, precision nutrition

**RESEARCH AND OTHER INTERESTS**  
Translational research, caloric restriction, clinical trials, reducing radiation toxicity

**JOINED TJU**  
2011

**RICHARD J. STABILE, MD**  
*Clinical Assistant Professor of Radiation Oncology*  
*Sidney Kimmel Medical College at Thomas Jefferson University*

Dr. Stabile received his MD from New York Medical College in New York. He did a residency in therapeutic radiology at the Mount Sinai Hospital in New York and is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Prostate, breast and lung malignancies

**RESEARCH AND OTHER INTERESTS**  
Chairman of Mercy Philadelphia Hospital weekly tumor boards

**JOINED TJU**  
2016

**JOHN SMYLES, MD**  
*Clinical Instructor in Radiation Oncology*  
*Sidney Kimmel Medical College at Thomas Jefferson University*

Dr. Smyles received his MD from Howard University College of Medicine where he also did a residency in radiation oncology with rotations at the VA Hospital, Georgetown University (Clinton) and the University of Maryland. He is board certified in radiation oncology.

**SUBSPECIALTY INTERESTS**  
Adult solid tumors

**RESEARCH AND OTHER INTERESTS**  
Cancer Liaison Physician – American College of Surgeons Commission on Cancer.

**JOINED TJU**  
2010

**MARIA WERNER-WASIK, MD, FASTRO**  
*Walter J. Curran Professor of Radiation Oncology*  
*Sidney Kimmel Medical College at Thomas Jefferson University*  
*Executive Vice Chair for Radiation Oncology Integration*

Dr. Werner-Wasik received her MD from the Wroclaw Medical Academy in Wroclaw, Poland. She completed residencies in internal medicine at Framingham Union Hospital, Framingham, Mass., and radiation oncology at Tufts University and the University of Pennsylvania. She is board certified in radiation oncology and was previously board certified in internal medicine.

**SUBSPECIALTY INTERESTS**  
Lung cancer and other thoracic malignancies; brain tumors, benign and malignant

**RESEARCH AND OTHER INTERESTS**  
Clinical trials in lung cancer and brain tumors. Contact principal investigator for NRG Oncology – Jefferson University Hospitals and Sidney Kimmel Cancer Center.

**JOINED TJU**  
1994
Mr. Charpentier received his BS in nuclear engineering from Rensselaer Polytechnic Institute and his MSc in medical physics from McGill University. He is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS**  Brain, lung and gynecologic tumors

**RESEARCH AND OTHER INTERESTS**  Imaging, SRS/SBRT, HDR

**JOINED TJU** 2015

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Junsheng Cao received his BS and MS from Tsinghua University and the University of Chicago. He is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS**  External beam therapy, brachytherapy, radiosurgery

**RESEARCH AND OTHER INTERESTS**  Quality and safety

**JOINED TJU** 2007

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Laura Doyle received her MS in radiological medical physics from the University of Kentucky. She is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS**  Brachytherapy

**RESEARCH AND OTHER INTERESTS**  Patient education, quality improvement, health care accreditation

**JOINED TJU** 2008
LEI FU, MS, DABR®
Clinical Instructor in Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Lei Fu received her MS from Rochester Institute of Technology and ME from Tsinghua University of China. She is board certified in therapeutic medical physics.

SUBSPECIALTY INTERESTS  External beam radiation therapy, radiosurgery

RESEARCH AND OTHER INTERESTS  SBRT, SRS, robotic prostate implant

JOINED TGU  2008

AMY HARRISON, MS, DABR®
Clinical Instructor in Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Amy Harrison received her MS from Wayne State University. She is board certified in therapeutic medical physics.

SUBSPECIALTY INTERESTS  External beam treatment planning including intensity modulation radiation therapy (IMRT) and volumetric modulated radiation therapy (VMAT), stereotactic body radiotherapy, healthcare quality and safety, operational efficiency, and quality metrics.


JOINED TJU  2004

JAMES KELLER, PhD
Clinical Instructor in Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Keller received his PhD in medical physics from the joint program of Oregon Health and Science University and Oregon State University. He completed his residency at Thomas Jefferson University in 2015.

SUBSPECIALTY INTERESTS  Accurate patient setup and dose delivery, innovative treatment modalities

RESEARCH AND OTHER INTERESTS  The application of new technology for safer and more effective radiation delivery, developing new curriculums for medical physics education

JOINED TJU  2013

JUN LI, PhD, DABR®
Assistant Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Li received his PhDs from Texas A&M University and Huazhong University of Science & Technology. He completed medical physics training at the University of Pennsylvania. He is board certified in therapeutic medical physics.

SUBSPECIALTY INTERESTS  Image-guided radiotherapy, radiosurgery

RESEARCH AND OTHER INTERESTS  Imaging application, dose calculation

JOINED TJU  2007
Dr. Li received his Ph.D. from Duke University and subsequently completed a residency in therapeutic medical physics at Duke University Medical Center. He is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS** External beam radiation therapy, HDR brachytherapy

**RESEARCH AND OTHER INTERESTS** Knowledge-based treatment planning, adaptive radiation therapy

**JOINED TJU** 2015

Dr. Mooney received her Ph.D. from the University of Virginia. She completed a medical physics residency in radiation oncology at Washington University in St. Louis. She is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS** HDR brachytherapy; MRI

**RESEARCH AND OTHER INTERESTS** Deformable image registration, MRI-based treatment planning, APBI breast brachytherapy.

**JOINED TJU** 2016

Dr. Liu received his PhD from Tsinghua University. He completed a radiation oncology medical physics post-doctoral fellowship at Wilmot Cancer Institute of Strong Memorial Hospital at the University of Rochester. He is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS** Stereotactic radiosurgery and radiotherapy, brain tumors

**RESEARCH AND OTHER INTERESTS** Clinical research, new technology and developments in the field of stereotactic radiosurgery and radiotherapy

**JOINED TJU** 2008

Dr. Peng received his PhD from Rensselaer Polytechnic Institute. He did a medical physics residency at the Medical College of Wisconsin. He is board certified in therapeutic medical physics.

**SUBSPECIALTY INTERESTS** Image-guided RT, adaptive RT, setup uncertainties

**RESEARCH AND OTHER INTERESTS** Image-guided RT, adaptive RT, setup uncertainties

**JOINED TJU** 2010
HAROLD PERERA, PhD, DABR®
Assistant Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University
Director, Off-campus Medical Physics Program, Department of Radiation Oncology
Thomas Jefferson University Hospitals

Dr. Perera received his PhD in physics from the University of Nebraska. He completed a radiation oncology physics residency at Washington University School of Medicine. He is board certified in therapeutic medical physics.

SUBSPECIALTY INTERESTS Brachytherapy, radiation safety

JOINED TJU 2007

PAUL R. STAUFFER, MSEE, CCE
Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University
Director, Thermal Oncology Physics, Department of Radiation Oncology
Thomas Jefferson University Hospitals

Paul Stauffer received his BS in physics from College of Wooster and MS in electrical engineering from the University of Arizona. He completed a five-year internship in clinical engineering at University of Arizona Health Sciences Center. He is board certified in clinical engineering and medical physics, with specialization in hyperthermia physics.

SUBSPECIALTY INTERESTS Hyperthermia, breast and chest wall recurrence, melanoma, pelvic malignancies

RESEARCH AND OTHER INTERESTS Clinical radiation therapy, innovation in devices and procedures, conformal thermotherapy, treatment planning, quality assurance, thermobrachytherapy implants

JOINED TJU 2013

MERAL L. REYHAN, PhD, DABR®
Assistant Professor of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Reyhan received her PhD from the University of California Los Angeles. She completed a medical physics residency at Rutgers-Cancer Institute of New Jersey in the department of radiation oncology. She is board certified in therapeutic medical physics.

SUBSPECIALTY INTERESTS Breast cancer, lung cancer, radiation-induced cardiac toxicity, magnetic resonance imaging, proton therapy

RESEARCH AND OTHER INTERESTS Quantitative magnetic resonance imaging, cardiac magnetic resonance imaging, applications of neural networks to radiation oncology, proton therapy

JOINED TJU 2016

YAN YU, PhD, MBA, FAAPM, FASTRO, DABR®
Professor and Vice Chair of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Dr. Yu received his PhD from University College London, U.K., and his MBA from the Simon Business School at the University of Rochester. He also completed a medical physics clinical fellowship at Thomas Jefferson University. He is board certified in therapeutic medical physics.

RESEARCH AND OTHER INTERESTS Medical physics and innovative technology-related projects

JOINED TJU 2006
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<tr>
<th>Disease Site</th>
<th>Physicians</th>
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</thead>
<tbody>
<tr>
<td>Brain and eye</td>
<td>Wenyin Shi, MD, PhD</td>
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<td></td>
<td>Maria Werner-Wasik, MD, FASTRO</td>
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<td>Voichita Bar Ad, MD</td>
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<td>Adam Dicker, MD, PhD, FASTRO</td>
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<td>Shari Rudoler, MD</td>
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<td>Upper gastrointestinal tract (esophagus and stomach)</td>
<td>Rani Anne’, MD</td>
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<td></td>
<td>Voichita Bar Ad, MD</td>
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<tr>
<td>Pancreas, liver and bile duct</td>
<td>Voichita Bar Ad, MD</td>
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<td>Mark Hurwitz, MD, FACRO</td>
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<td>Rani Anne’, MD</td>
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<td>Lower gastrointestinal tract (colorectal and anus)</td>
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<td>Voichita Bar Ad, MD</td>
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<td>Mark Hurwitz, MD, FACRO</td>
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<td>Head and neck</td>
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<td>Rani Anne’, MD</td>
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<td>Lung</td>
<td>Maria Werner-Wasik, MD, FASTRO</td>
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<td>Bo Lu, MD</td>
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<td>Breast</td>
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<td>Lymph and total body irradiation</td>
<td>Wenyin Shi, MD, PhD</td>
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<td>Maria Werner-Wasik, MD, FASTRO</td>
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<td>Spinal cord tumors</td>
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<td>Maria Werner-Wasik, MD, FASTRO</td>
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<td>Gynecologic cancers and high dose radiation</td>
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<td>Robert Den, MD</td>
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<td>Genitourinary (Kidney, bladder, prostate, ureter and urethra)</td>
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<td>Skin</td>
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<td>Sarcoma</td>
<td>Scot Fisher, DO (soft tissue sarcoma)</td>
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<td>Melanoma by site</td>
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<td>General Radiation Oncology</td>
<td>Usha Babaria, MD</td>
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<td>Jessie DiNome, MD</td>
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<td>Wayne Pinover, DO</td>
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The Department of Radiation Oncology is committed to offering the most advanced radiation treatment options to all patients. In addition to new evidence-based techniques and technologies, we are continually working to streamline workflows and forge community partnerships for better patient outcomes.
JEFFERSON HOSPITAL FOR NEUROSCIENCE (JHN)

• We aim to establish the Department of Radiation Oncology’s brain tumor program as a center of excellence and patients’ center of choice. The Jefferson Hospital for Neuroscience employs patient navigators to improve access to multidisciplinary care, including same-day and next-day appointments for new and established patients and an effortless process for referral, evaluation and care. The hospital is developing a specific service path for patients with brain metastases that allows one-day evaluation and streamlined treatment.

• Wenyin Shi, MD, PhD, the JHN’s medical director for radiation oncology, leads Jefferson’s multidisciplinary brain tumor group in monitoring clinical trials – investigator-initiated, cooperative group, and pharmaceutical – for patients with brain tumors.

• The Jefferson Hospital for Neuroscience is a national and international fellowship-training site, integrating brain tumor care across Jefferson, Abington and Aria Health.

TOTAL SKIN ELECTRON BEAM THERAPY FOR LYMPHOMA

Jefferson is one of the region’s few institutions offering total skin electron beam therapy, or TSEBT, for cutaneous T- and B-cell lymphoma. The Jefferson Cutaneous Lymphoma Center brings together radiation oncologists, medical oncologists, dermatologists and pathologists. TSEBT uses electron beams on the skin surface, sparing deeper normal structures. More than 90 percent of patients respond completely, and TSEBT is especially effective for disease refractory to other skin-directed therapies.

While the traditional course is nine weeks, Jefferson offers a two-week course with favorable clinical outcomes and minimum toxicity. Median time to progression is more than one year, equivalent to the nine-week treatment. A clinical trial combining short-course TSEBT with bone marrow transplant is open and a trial of short-course TSEBT followed by maintenance mechlorethamine opens soon.
DEPARTMENT ADMINISTRATION

Alex Khariton, MBA, RTT
Vice President, Radiation Oncology and Cancer Services

Mr. Khariton received his MBA from Fairleigh Dickinson University and is a graduate of the Wharton School of Business Leadership Development Program. He serves as an adjunct professor at the Jefferson College of Health Professions.

Other Interests and Professional Activities: Mr. Khariton is a board member of the Society of Radiation Oncology Administrators and served as co-chair of the Reimbursement and Economic Committee.

Joined Jefferson: 2012

Anne Lowther, MSRS, RT, CT
Administrator

Ms. Lowther received her master’s degree at Thomas Jefferson University and is a guest lecturer at Gwynedd Mercy University. She is a board-certified radiologic technologist and former professor of radiography at Drexel University.

Other Interests and Professional Activities: Ms. Lowther works closely with radiation oncology vendors for solutions to workflow and efficiency issues.

Joined Jefferson: 2005

Daniel Clancy, RN
Senior Clinical Manager

Mr. Clancy received his nursing degree from Hahnemann University and is an active member of the Oncology Nursing Society.

Other Interests and Professional Activities: Mr. Clancy has an extensive nursing background with expertise in operating room workflow and compliance.

Joined Jefferson: 2013

The other members of our administrative team include Eileen Comber, MBA (Director, Revenue Cycle); Nicholas DeGregorio (Associate Director for Information Systems and Technology, serving Radiation Oncology, Medical Oncology, Cancer Biology, and the Sidney Kimmel Cancer Network); Amy S. Harrison, MS (Director of Clinical Operations, Division of Medical Physics); Frank Spitz III (Clinical Engineer); Amy K. Taylor, RTT, and Kathy Wilson, RTT (Co-Chief Therapists); and Jamie Williamson (Operations Manager).
Jefferson’s Department of Radiation Oncology’s clinical care objective is to ensure that every individual for whom we are honored to care knows that the only patient we have to treat today is you!

Administrative Team
Leadership, along with the quality and safety team, oversees every aspect of the patient’s care.

Clinical Team
Radiation oncologists, nurse practitioners, residents, nurses, social workers — all work together to ensure quality care.

Support Services
Patient navigators work with patients and families to help them during their care.

The Patient
Our physicians offer cutting-edge research trials to patients.

Clinical Trials
Support Services
Patient navigators work with patients and families to help them during their care.

Technical Team
Medical physicists, dosimetrists, radiation therapists and information systems and technology provide expert knowledge in the delivery of radiation therapies.
NURSE PRACTITIONERS PLAY VITAL ROLE IN SURVIVORSHIP PROGRAM

The U.S. Centers for Disease Control’s National Action Plan for Cancer Survivorship includes analyzing disease surveillance, advocating for cancer prevention and optimizing patient access to care for post-treatment symptoms. At Jefferson, breast cancer survivors receive individual survivorship plans with input from both radiation and medical oncology teams. Radiation Oncology patients have access to a survivorship team that navigates inquiries about physical, psychological and financial stressors. Carevive® software is utilized to generate individual care plans. This interactive planning tool allows patients to complete surveys on emotional and physical health before meeting with the team.

“The survivorship visit was initially more of a disease-focused visit, but now we focus on the total patient, including disease prevention and healthy living,” says Linda Ferguson, MSN, CRNP, who manages the Department of Radiation Oncology’s survivorship program. “Consultations are tailored to each patient’s needs.”

By the end of 2016, the Sidney Kimmel Cancer Center’s team had survivorship plans for 25 percent of breast cancer patients who were treated with curative intent. To help reach this goal, the Center offered telehealth survivorship care via secure video. Survivors of gynecologic and colorectal cancers will soon receive Carevive plans and the department plans to expand this care for survivors of all cancer types. All patients of the Cancer Center, including radiation therapy patients, are invited to conferences, support programs and workshops on life after a cancer diagnosis.

The role of the nurse practitioner in radiation oncology continues to evolve as health care demands increase. The paradigm shift to cost-effective care that maximizes use of physicians has allowed the oncology nurse practitioner role to expand. Radiation oncology nurse practitioners have grown in numbers nationwide, including at Jefferson. The Department of Radiation Oncology currently employs two nurse practitioners.

As cancer survival rates continue to rise, so does the need for ongoing care. The oncology nurse practitioner plays a vital role in survivorship care planning. Cancer survivors face challenges including the need for ongoing medical care, psychosocial
support, surveillance for recurrent disease and evaluation for late toxicities. The first survivorship clinic at Jefferson commenced in the Department of Radiation Oncology. During the initial visit, the patient meets with our nursing staff, social worker and nurse practitioner. The visit focuses on disease prevention and surveillance.

As our program grows, we have begun to implement individual survivorship care plans for patients who have completed treatment. The survivorship care plan is a detailed summary of treatment history, guidelines for future care, potential late toxicities and available resources. As noted above, we implemented the use of Carevive software, which provides an interactive template. Patients receive a care plan within six months of completing treatment.

New goals include implementing a multidisciplinary survivorship clinic in which Medical Oncology and Radiation Oncology nurse practitioners will see patients together to develop and carry out the survivorship care plan. This will be an innovative approach to survivorship care, in addition to an opportunity for research. Telehealth will also be implemented to meet the needs of survivors.

HYPERTHERMIA AT JEFFERSON

When patients have few treatment options, heat – hyperthermia – can come to the rescue. Heating tissue to 104-113 degrees Fahrenheit can kill cancer cells or make them more sensitive to radiation, chemotherapy and immunotherapy. Typically, hyperthermia has no or little toxicity. It has mainly been a second-line cancer treatment, but Jefferson has initiated protocols to incorporate it as a first-line therapy. Beginning in 2014, Mark Hurwitz, MD, with more than 20 years’ experience in thermal therapy, reinvigorated Jefferson’s thermal oncology program. He recruited Paul Stauffer, MSEE, CEE, as Director of Thermal Oncology Physics. (Hurwitz and Stauffer are both past presidents of the Society for Thermal Medicine and Stauffer has received its highest honor, the Eugene Robinson Award.)

Program faculty are developing clinical trials of moderate-temperature hyperthermia to enhance radiation, chemotherapy and immunotherapy. Hurwitz and Stauffer participate in the Atzelsberg Circle, a European working group for hyperthermia trials, and are opening the first non-European site for an anal cancer trial. The program hosts visiting researchers, including David Vrba, PhD, from the Czech Republic, and has instituted an international training program with physicist Dario Rodrigues, PhD, as the first post-doctoral student. Finally, a collaboration with Drexel University helps undergraduate engineering students develop skills related to thermal therapy.
HOW JEFFERSON RADIATION ONCOLOGY TREATS BREAST CANCER

Patients at every Jefferson Health location benefit from advanced physics and sophisticated technologies, including:

**Real-time Position Management™ (RPM) respiratory gating** – A technology system that enables our clinicians to target tumors and minimize radiation to the heart.

**Prone position delivery** – Patients lie on their stomachs so the targeted breast falls away from the chest, minimizing heart and lung exposure. Jefferson is the only academic center in Philadelphia using this method of radiation delivery.

**Four-dimensional CT simulation** – This imaging technique provides information on the motion of the heart and other vital organs during respiration, minimizing their exposure to radiation.

**Intensity-modulated radiation therapy (IMRT)** – Delivers radiation that precisely fits the 3-D shape of a tumor and tightly regulates intensity, targeting tumors more closely than traditional radiation and sparing surrounding tissue. Jefferson was the first in the Delaware Valley to use IMRT.

**Brachytherapy** – Temporary implantation of a delivery system that allows for direct delivery of radioactive seeds to the tumor site.

**Intraoperative radiation therapy (IORT)** – Delivery of a large dose of radiation directly to the tumor site on the day of surgery.

**Hypofractionated radiation therapy** – Delivers a higher daily dose of radiation in 5-21 treatments, versus the standard 25-30 treatments.

**Accelerated partial breast irradiation (APBI)** – Delivers radiation treatment to only the part of the breast with the tumor, over a shorter time. Approaches include brachytherapy and external beam radiation with 3-D CRT, with a week of twice-daily treatments.
Conformal 3D radiation therapy (RT) — This is a precise multi-field form of external beam radiation suitable for treating most lung cancers and other thoracic tumors. The tumor, or target, is first visualized on the planning CT scan performed in the Department of Radiation Oncology. Next, the physician contours, or outlines, the tumor in three dimensions so the computer can design a customized RT plan. This includes defining the number of RT beams and their strength and direction to deliver a full dose of RT to the tumor while minimizing the dose to the surrounding normal organs, including healthy lung tissue, the esophagus and spinal cord. The dose is shaped to match the tumor, hence the term “conformal.”

Volumetric modulated arc therapy (VMAT) with cone beam computed tomography (CBCT) — VMAT is a higher level of conformal RT and a subtype of intensity modulated radiation therapy (IMRT). Instead of stationary beams directed at the tumor, the head of the linear accelerator, which produces the radiation, rotates in an arc around the patient. The RT beam continuously changes in intensity, delivering a tightly shaped radiation dose. VMAT is particularly suited to situations in which a normal organ is located very close to the irradiated tumor. It is because of such tight margins between tumor and organ that a cone beam CT scan is performed before each RT daily dose (or fraction) while the patient lies on the table in the treatment position. Such daily verification of the position of the tumor target and surrounding tissues is named image guided radiation therapy (IGRT), and is considered a major step toward increased precision of RT.

Stereotactic body radiation therapy (SBRT) — This has been a major accomplishment in RT over the last several years and is particularly beneficial for patients with inoperable small (Stage I) lung cancers who cannot or prefer not to undergo surgical resection. The radiation is focused on the tumor with millimeter precision, which allows for delivery of very large RT fractions over three to five days with a high expectation of cure. IGRT with cone beam CT is mandatory for all patients treated with SBRT.

Clinical trials — A clinical trial is a research study involving patient volunteers. Trials are conducted to find safe and effective treatments for a variety of health conditions. They are critical to advancing medicine and improving patient health. Participating in clinical trials offers patients the opportunity to try new and effective treatments that could potentially improve their condition, while taking part in vital research that can benefit many future patients.
Ultrasound-guided high dose rate brachytherapy –
High-dose rate (HDR) brachytherapy is a type of internal radiation therapy that delivers radiation from implants placed close to or inside tumors. Because cancer often affects organs and other essential structures, it is important for radiation treatment to be tightly focused on tumors to minimize serious side effects. This technique ensures the maximum radiation dose is given to cancerous tissues while minimizing exposure of surrounding healthy tissue.

Stereotactic body radiation therapy –
Stereotactic body radiation therapy (SBRT) uses advanced imaging techniques to deliver a targeted radiation dose to a tumor. The radiation is focused on the tumor with millimeter precision, limiting damage to healthy tissue. Preserving healthy tissue is important for cancer patients whose tumors are near or in essential organs.

Radium-223 –
Radium 223 is a type of internal radiotherapy treatment. Radium is very similar to calcium and, like calcium, active bone cells take up the radium. This makes it a good way to specifically target bone cancer cells. Cancer cells are more active than normal bone cells and so are more likely to pick up the radium 223.

Volumetric modulated arc therapy (VMAT) with cone beam computed tomography (CBCT) –
This treatment uses image-guided radiation therapy (IGRT) via three implanted gold seed markers in the prostate gland. This image guidance is integrated with an intensity-modulated beam that is shaped to fit and surround the prostate gland, aiming at the prostate gland continuously as the gantry rotates around the patient. This specialized, state-of-the-art beam is called VMAT. This technique allows delivery of higher radiotherapy doses, which translates into better cure rates and fewer side effects. With such accurate technology, the margin around the prostate that needs to be covered has been reduced, thus sparing more rectum and bladder tissue from exposure.

SpaceOAR –
The SpaceOAR system reduces rectal injury in men receiving prostate cancer radiation therapy. OAR stands for "organs at risk," and this system includes a hydrogel spacer to protect rectal tissue from RT to the prostate gland.

Genomic testing –
Genomic testing is done on cancerous tissue taken from the prostate in order to provide information about how the prostate cancer might behave. By looking at the genetic makeup of the cancer, these tests may help predict whether your prostate cancer grows slowly or aggressively. Genomic testing can be performed on biopsy tissue and tissue from an entire prostate following a prostatectomy.

Clinical trials –
A clinical trial is a research study involving patient volunteers, conducted to find safe and effective treatments for a variety of health conditions. Trials are critical to the advancement of medicine and improving patient health. Participating in clinical trials offers patients the opportunity to try new and effective treatments that could potentially improve their condition while taking part in vital research that can benefit many future patients.
External beam radiation is typically given over a period of weeks, sometimes at the same time as chemotherapy. Types of external beam radiation used to treat brain and spine tumors include:

- 3D conformal radiation therapy (3D CRT)
- Intensity-modulated radiation therapy (IMRT)
- Volumetric modulated arc therapy (VMAT)

The delivery of radiation treatment is further improved with image-guided radiation treatment (IGRT). IGRT is a component of the radiation therapy process that incorporates imaging coordinates from the treatment plan to be delivered in order to ensure the patient is properly aligned in the treatment room. The goal of the IGRT process is to improve the accuracy of the radiation field placement and to reduce the exposure of healthy tissue during radiation treatments. The IGRT techniques used at Jefferson include cone beam CT (CBCT), exacTRAC, electronic portal imaging devices (EPID) and visionRT. Safety is maximized not only by precise aim, but also by dividing the radiation delivered to those areas over multiple days, up to seven weeks.

Stereotactic radiosurgery (SRS) delivers a very targeted high dose of radiation and is given in one or a few very high doses. At Thomas Jefferson University, radiation oncologists use leading-edge noninvasive techniques, including Gamma Knife, CyberKnife and TrueBeam STx. Our radiosurgery platforms allow us to treat a number of brain tumors, skull base tumors and facial pain by creating a complex sculpted radiation plan tailored to the individual patient’s tumor. Diseases commonly treated with SRS include:

- Brain metastasis
- Benign brain tumor (meningioma, acoustic neuroma, pituitary adenoma, etc.)
- Arteriovenous malformation (AVM)
- Spinal and paraspinal tumor (vertebral metastasis, spinal meningioma, spinal schwannoma, etc.)
- Intraocular melanoma

Fractionated stereotactic radiation treatment (FSRT) uses the same highly focused radiation delivery technique as SRS, but delivered over a number of daily fractions over five or six weeks. The number of treatments is determined by the size and type of the tumor and proximity to adjacent tissues. FSRT is used for effective local tumor control with minimum normal tissue damage.

Brachytherapy is implantation of radioactive material for the direct delivery of radiation to the tumor site. At Thomas Jefferson University, radiation oncologists and neurosurgeons use radiative seeds to treat patients with recurrent brain tumor for whom external beam radiation is not suitable.

Brainlab Elements Automatic Brain Metastases Planning is a new software program that will simplify stereotactic radiosurgery planning for patients with metastatic brain tumors. It allows treatment of up to 10 brain metastases at the same time and has dramatically reduced treatment time for these lesions.
Partnerships with the Department of Radiation Oncology allow hospitals throughout the Delaware Valley to offer the most advanced cancer care. Patients at Aria Jefferson Health, Riddle Hospital, Mercy Fitzgerald Hospital, Mercy Philadelphia Hospital, Nazareth Hospital, Easton Hospital, Delaware Valley Urology and the CyberKnife Unit at Rothman Orthopaedic Specialty Hospital benefit from Jefferson’s powerful interdisciplinary oncology team. Instead of a “visiting specialist” model, with faculty rotating to community locations, each hospital has permanent Jefferson physicians. Linking with Jefferson also enhances patients’ clinical trial access.

“Everywhere you have a Department of Radiation Oncology program, you should get the same quality of care,” says Scot Fisher, DO, Professor and Associate Director of the Sidney Kimmel Cancer Network. Dr. Fisher directs the off-campus programs. “Our physicians are embedded in community hospitals and our physicists and equipment are fully integrated – that’s why it works so well.”

Partnerships also enhance the department’s research programs. Our sites participate in national clinical trials and contribute to the total number of patients accrued to clinical trials at Jefferson. At Aria-Jefferson, physicians are studying financial toxicity in radiation oncology. This work will analyze patient and physician attitudes about financial issues in radiation oncology.

Jefferson Radiation Oncology’s strong reputation allows it to continue forging partnerships across the region. Options range from co-ownership to coverage support, electronic chart rounds and quality review. Partners have access to the best technology available and international radiation oncology experts.
The Medical Physics Division of Jefferson Radiation Oncology, under the leadership of Vice Chair and Division Director Yan Yu, PhD, MBA, FASTRO, is a fully integrated team of medical physicists, dosimetrists and radiation therapists who design and deliver every patient’s customized treatment. The team also:

- Performs patient-specific quality assurance at multiple points in each therapy course.
- Develops, commissions and implements new programs and treatment modalities.
- Assures compliance with standards for megavoltage radiation, practice accreditation, continuous quality improvement and safety.

As Medical Physics director, Dr. Yu has overseen harmonization of essential policies and procedures that govern all technical operations, quality assurance standards and practices and workflow of high-complexity procedures.

New Medical Physics programs add to Jefferson curriculum

In collaboration with the Institute of Emerging Health Professions and the Department of Radiological Sciences, the Department of Radiation Oncology has created two new programs: the Masters of Science in Medical Physics and the Medical Physics Assistant Certificate. “These innovative programs are designed not only to be compatible with Thomas Jefferson University’s mission statement, but also to take advantage of the professional expertise of the entire educational community at Jefferson,” said James Keller, PhD, who directs both programs.

The two new curricula consist of existing courses and new courses in radiation physics, medical imaging physics and applied radiation therapy laboratories. The Medical Physics Assistant program is a one-year program focusing on practical implementation of medical physics and patient safety. This is mirrored by the Masters of Science program, as both require successful completion of a clinical practicum. The second and final year of the Masters of Science degree requires a capstone project that amounts to original research conducted under the mentorship of a faculty member. These two new Department of Radiation Oncology programs are designed to develop critical thinking skills while imparting the highest level of professionalism and ethical responsibility to its future professionals.
The Department of Radiation Oncology has a rich history of clinical trial participation, dating back to the founding of the Radiation Therapy Oncology Group (RTOG) by our inaugural chair Simon Kramer, MD, in 1968. We were an RTOG Main Member Institution until 2014, when RTOG became part of the National Cancer Institute-sponsored clinical trial network NRG Oncology, where we are a Main Voting Member Institution, one of only 90 such institutions in North America. We currently enroll 50-60 patients in studies by NRG Oncology and its 30 affiliate members each year. In addition to participating in NCI-sponsored research, our faculty members have been extremely successful in designing, conducting and publishing the results of many investigator-initiated trials.
All faculty and trainees realize the crucial importance of participation in clinical trials for advancing cancer research, defining new standards of care and improving patients’ outcomes. In addition to offering a large portfolio of the RTOG (now NRG Oncology) trials, Department faculty have designed and conducted several investigator-initiated trials (IITs).

A total of 200 patients over five years were enrolled into IITs designed independently by our faculty. A high level of innovation is evident in these trials, including such forefront areas of investigation as hypofractionated radiation therapy for prostate cancer in combination with brachytherapy; caloric deprivation in breast cancer; tracking circulating tumor cells or free circulating tumor DNA in patients undergoing radiation and chemotherapy; immunotherapy for metastatic solid tumors or brief meditation practice as means of combating fatigue in irradiated patients.

In addition, the University is one of the leading NRG Oncology sites in accrual numbers and data quality, listed among the Top Five Main Member institutions for 2015 and 2016 and awarded for the efforts of running an efficient network of 33 affiliate member institutions.

The Department of Radiation Oncology has a strong record of excellence in cancer clinical trials, specifically in legacy cooperative group trials. This includes a rich history of activity within the Radiation Therapy Oncology Group (RTOG), the only NCI-sponsored clinical research cooperative group devoted to radiation therapy. As the original RTOG founding institution under Dr. Simon Kramer in 1968 and RTOG Full Member since 1970, Jefferson has consistently been exceeding an annual minimum enrollment of 25 patients (see Table 1). From 2010-2014, we had 10-15

Figure 1. Patients Screened and Enrolled in Clinical Trials in the Department of Radiation Oncology, Thomas Jefferson University
active RTOG clinical trials each year, which represents 25-40% of the entire annual RTOG portfolio. Jefferson was one of the Top Ten accruing Full Member RTOG institutions as of May 2011.

LAURA DOYLE, MS
Quality of Care
Radiation therapy can be a complicated topic for both patients and providers. Advanced technology, complex terminology and a treatment that cannot be heard, seen or felt leaves many patients with questions. Members of Thomas Jefferson University’s Radiation Oncology Department teamed up with Al Crawford, PhD, from the College of Population Health to study patient education related to quality and safety in radiation therapy with a two-year grant from Varian Medical Systems. The team surveyed patients on topics of greatest concern. From these results, the Division of Medical Physics designed educational materials. Distribution of these focused educational materials received great praise from patients for enhancing the quality of care at Jefferson Radiation Oncology.

HAISONG LIU, PhD
Stereotactic Radiosurgery Research
As the Jefferson Hospital for Neuroscience accumulates experience treating multiple brain metastases with stereotactic radiosurgery, with a single isocenter using the BrainLAB Element, its medical physics team is developing a dosimetry baseline for this type of treatment. Specifically, my team is building a mathematical model based on the patient’s prescription, the target volume of
TAORAN LI, PhD
My research interests include online adaptive radiation therapy, phantom-less patient specific quality assurance, knowledge-based treatment planning and deformable image registration and dose accumulation. In addition, I am also interested in exploring and developing visually based instructional methods to improve student and resident training and enhance education for patients and the public.

YAN YU, PhD, MBA, FASTRO
Dr. Yu’s research has spanned the areas of developing robotic brachytherapy and smart needle interstitial intervention, tumor motion tracking with robotic couch, using ultrasonic pressure and near-infrared spectroscopy to assess tumor vascular environment and developing multi-objective treatment plan optimization strategies. Members of the research teams he has assembled have advanced the field by creating American Association of Physicists in Medicine Working Groups and producing Task Group reports on robotic interstitial interventions, and by conducting first-in-human clinical studies on assessing tumor characteristics both noninvasively via ultrasonic pressure and spectroscopy, and by using smart needles. The next phase of these research endeavors will see translation into global health applications and into a project involving longitudinal measurement of tumor hypoxia, generally a hallmark of treatment resistance. Ultimately, we hope to show that such novel technological development will become an effective, convenient and low-cost option for cancer detection and characterization, early assessment of treatment response, monitoring and optimizing individualized treatment strategies and long-term surveillance.

More recently, he and Dr. Zehra Yegingil, a visiting professor from Adana, Turkey, have assembled a team of researchers from Turkey, Israel (Yaacov Lawrence, MD, Director, Center for Translational Research in Radiation Oncology Sheba Medical Center, Tel HaShomer Hospital, Tel Aviv University), Ukraine and South Korea to develop novel radiation detectors for radiation countermeasures. Funded by NATO’s Science for Peace and Security program, this team of international experts will not only contribute to countermeasures against nuclear threats, but also advance the field of solid-state dosimetry for health care applications such as radiation oncology in vivo dosimetry and dose tracking for patients receiving radiation therapy.
**PRAMILA RANI ANNE', MD**
I am an associate professor in Radiation Oncology at the Sidney Kimmel Medical College at Jefferson. I have focused my clinical research in two areas. One is improving the therapeutic ratio in patients with gastrointestinal cancer. I have been a principal or co-principal investigator in clinical trials, combining radiation with other agents to see if outcomes can be improved. My other focus is on decreasing the side effects of treatment. I have investigated the use of radiation protectors and breath hold techniques to decrease heart dose from left-sided breast radiation.

**VOICHITA BAR AD, MD**
I am an associate professor of Radiation Oncology at the Sidney Kimmel Medical College at Jefferson. I have extensive clinical experience in treating head and neck, gastrointestinal and lung cancers. I am also involved in clinical and translational research. My initial work focused on quality of life and treatment of radiation-induced mucositis and esophagitis.

Currently, I am an institutional principal investigator or co-investigator of the following Radiation Therapy Oncology Group clinical trials for head and neck tumors: RTOG 1008 and RTOG 0920. RTOG is a leading National Cancer Institute cooperative group in radiation oncology. I am very proud that our head and neck cancer group has accrued several patients to the RTOG 0920 study and had the second highest number of patients enrolled nationwide in 2013. I have had a prosperous collaboration with nationally renowned radiation oncologists through the RTOG network, including being part of the RTOG research group approved for the PA Cure Grant for defining and validating a novel cardiac contouring atlas for lung cancer patients using the RTOG 0617 database. My RTOG secondary analysis sponsored by a MimVista grant is investigating the use of atlas-based automatic segmentation of intra-thoracic structures for lung cancer patients. This is a new tool for clinicians and a quality assurance instrument for the RTOG multi-institutional trials’ review.

Furthermore, I have opened investigator-initiated trials on the prognostic value of circulating tumor DNA for patients with advanced head and neck and lung cancers. I am involved in developing a new immobilization device for treatment of head, neck, and brain cancers. The goal is to bring these innovations to my patients’ care.

**MARK D. HURWITZ, MD**
On national and international levels, I have directed research efforts to translate biology and technology into clinical practice. I have an extensive track record of leading clinical trials that have advanced treatment of genitourinary malignancies and application of thermal medicine. I have been principal investigator for successfully completed RTOG and Cancer and Leukemia Group B (CALGB) studies for
prostate cancer and am currently the PI of NRG GU002, an international phase II/III trial building on the success of RTOG 0621. This study is designed to assess the ability of docetaxel to improve treatment outcomes when added to post-operative radiation and hormonal therapy for high-risk patients who have previously undergone prostatectomy. I have also led important trials in thermal oncology, including a phase II trial demonstrating the benefit of hyperthermia to treat locally advanced prostate cancer. I served as PI of an international phase III trial that established benefit for magnetic resonance guided-focused ultrasound treatment of painful bone metastases. I belong to the Atzelsberg Circle Clinical Trials Working Group, based in Erlangen, Germany. Currently, I am opening an Atzelsberg Circle-sponsored randomized phase II trial to assess radiochemotherapy with or without hyperthermia in treatment of anal cancer. Jefferson will be the first US center to offer patients participation on this leading European study. Additional thermal therapy studies include a trial combining single fraction high dose rate brachytherapy and hyperthermia in treatment of radio-recurrent prostate cancer. Jefferson is also poised to serve as the sole US site of a trial exploring the combination of Thermodox, a temperature-sensitive liposome, with radiation and hyperthermia to treat recurrent breast cancer.

WENYIN SHI, MD, PhD

My clinical research focuses on improving the therapeutic ratio for cancer patients, which means better treatment outcomes with less toxicity. I have developed multiple innovative clinical trials incorporating novel molecular targeting agents with radiation for patients with brain cancer. My investigations involve a variety of new agents such as anti-angiogenic agents, vascular disrupting agents, signal transduction pathway inhibitors and immune modulators. Previous investigations include combining a novel H-DAC inhibitor, vorinostat, with whole brain radiation for patients with brain metastases; combining a novel H-DAC inhibitor, panobinostat, with stereotactic radiation for patients with recurrent glioma; and combining an immunotherapy agent, ipilimumab, with radiation for patients with melanoma and brain metastases. This work was presented at national and international meetings and published in peer-reviewed journals. Currently, I am using a novel aurora kinase inhibitor, alisertib, with stereotactic radiation in patients with recurrent glioma. This trial is currently open and enrolling.

In other research, I focus on improving radiation technology to reduce toxicity to healthy tissue. Innovations include establishing frameless radiosurgery treatment at Jefferson, optimizing radiation technique for whole brain treatment to preserve neurocognition and establishing a novel radiosurgery technique for brain metastases that delivers high quality, efficient treatment several times faster than conventional delivery methods.
ROBERT B. DEN, MD
I am an associate professor in the Departments of Radiation Oncology, Cancer Biology and Urology at the Sidney Kimmel Medical College at Jefferson and co-director of the Department of Radiation Oncology’s Multidisciplinary Genitourinary Oncology Center at Thomas Jefferson University Hospitals. My research focuses on improving the therapeutic ratio for cancer patients using two avenues: genomics and new technologies. This has led to various initiatives in basic, translational and clinical trials and exploration.

Our research, in collaboration with GenomeDx Biosciences, has enabled us to select which patients need multi-modality treatment after surgery for prostate cancer. Further, we identified a cohort of men who benefit from adjuvant as opposed to salvage radiation therapy. This finding has major clinical implications.

In terms of new technologies, we have implemented a high dose rate brachytherapy program at Thomas Jefferson University and recently completed a study incorporating HDR brachytherapy with stereotactic body radiation therapy to treat men with intermediate-risk prostate cancer. This approach provides a high biologic dose with sparing of normal tissues in a patient-friendly treatment schedule. We plan to use our findings as the backbone of future clinical trials.

ADAM P. DICKER, MD, PhD, FASTRO
I am the Enterprise senior vice president and chair of Radiation Oncology at Jefferson. I am a professor of Radiation Oncology, Pharmacology and Experimental Therapeutics at the Sidney Kimmel Medical College at Jefferson. I coordinate an interdisciplinary team of oncologists, physicists and scientists in multidisciplinary efforts to define fundamental mechanisms and targets for combined modality radiation treatment and efficiently translate them to effective innovations in treating cancer patients. Over the past four years, we have made strides in various aspects of high-impact science, including immunotherapy, genomic medicine, novel therapeutic targets, caloric restriction and cancer metabolism. Further, we are able to translate our laboratory investigations into novel clinical trials to advance our current practice in radiation oncology.

We have developed “Strength through Insight,” one of Apple’s 13 ResearchKit smartphone applications. This tool has been presented to the U.S. Food and Drug Administration and approved by Apple. The app is an engagement tool for patients receiving prostate cancer treatment. Its use demonstrates the considerable impact patient perspective can have on practice. It also empowers patients to manage their own health through mobile devices. This application represents the wave of the future in patient care and smart-device connectivity models. This user-friendly tool is both an achievement in clinical care and a gateway to important research.
BO LU, MD, PhD
I am a professor of Radiation Oncology at the Sidney Kimmel Medical College at Jefferson and Director of the Division of Molecular Radiation Biology at Thomas Jefferson University Hospitals. Currently, I have two major projects: therapeutic resistance of lung cancer and Immunotherapy.

Therapeutic resistance of lung cancer: ALK-translocated lung cancer patients are treated with crizotinib, a tyrosine kinase inhibitor that attenuates ALK signaling. However, crizotinib resistance is a common cause of treatment failure. We have developed both cell and mouse models of crizotinib-resistant lung cancer. These models show that a downstream transcription factor of ALK signaling, stat3, mediates stem cell features of crizotinib-resistant cancer. This contributes to its immune-suppressive and radioresistant phenotypes. This finding opens up an alternative therapeutic strategy for ALK+ lung cancer patients. Our work has won support from pharmaceutical partners, including Novartis and Pfizer. Part of our study results were presented in an oral session at the 2016 ASTRO annual meeting, and a manuscript is in preparation for Clinical Cancer Research.

Immunotherapy: Cancer immunotherapy now plays a pivotal role in improving outcomes for patients with lung cancer, with FDA approvals of PD-1 inhibitors. Our research projects investigate the optimal combination of anti-PD1 agents with standard radiotherapy to maximize therapeutic ratio. We are also exploring ways to enhance PD-1 inhibitors and reduce normal tissue toxicities from combination treatment. The addition of other targeted cancer drugs is being investigated to learn whether they can further improve the efficacy of anti-PD1 immunotherapy. We are working to understand the underlying mechanisms of these treatments, using our established models of resistance to PD-1 inhibition as well as profiling tissue samples collected from our ongoing clinical trial combining pembrolizumab, a PD-1 inhibitor, with radiotherapy. These studies are supported by a U.S. Department of Defense lung cancer grant and funding from our industry collaborators. Parts of these studies were presented in an oral session at the 2016 ASTRO annual meeting, and a manuscript is under review by the Journal of the National Cancer Institute.

NICOLE L. SIMONE, MD
I am the co-leader of the Breast Cancer Research Program for the Sidney Kimmel Medical College at Jefferson, where I am also the Margaret Q. Landenberger Associate Professor of Radiation Oncology. My work focuses on two main areas, described below.

Increasing radiation sensitivity via dietary alterations. We have remarkable results using caloric restriction to enhance the effects of radiation, chemotherapy or targeted therapy. Our first-in-human clinical trial evaluated the impact of reducing calories on women undergoing radiation therapy. Caloric restriction alters the molecular pathways involved in radiation. Combining it with radiation led to greater tumor shrinkage, fewer metastases and improved survival over radiation alone. We are now enrolling on two other clinical trials, including one conducted during neoadjuvant chemotherapy for breast cancer that uses the patient’s tumor characteristics to drive a precision nutrition approach. We are now expanding this approach to other disease sites and stages.

Increasing radiation sensitivity via microRNA changes. I have developed a miR signature that is altered with radiation. In particular, markers of radiation resistance have been identified and we have determined that diet can be used to increase radiation sensitivity through the alteration of microRNAs. Our first clinical trial using radiation with diet showed that we are able to alter miR profiles to create a more radiation-sensitive phenotype. We have now translated these findings into a clinical trial whose primary endpoint is to assess miR change after a dietary intervention before surgery. The trial is being conducted in patients with prostate, breast and endometrial cancer. Our long-term goal is to delineate how miRs can be altered to increase radiation effectiveness and to improve cancer outcomes. We will then translate these findings directly to patients.
Quality and safety are high-profile issues in medicine today. According to a recent British Medical Journal article, medical errors are the third leading cause of death in the United States (BMJ 2016; 353 doi: http://dx.doi.org/10.1136/bmj.i213).

The Department of Radiation Oncology was one of the first departments involved with the specialty’s new patient safety organization: Radiation Oncology Incident Learning System, or RO-ILS, now at 150 institutions and counting. The department served as a beta tester, and chair Adam Dicker, MD, PhD, serves on the advisory board. Members share challenges, system errors and de-identified data used to improve quality and safety.
Department Quality Committee accomplishments under the leadership of Dr. Mark Hurwitz, Vice Chair for Quality, Safety and Performance Excellence, include:

- Reducing missed on-treatment visits
- Ensuring pain is assessed and addressed every patient, every visit.
- Professional Performance Evaluation metrics
- First in specialty patient-centered specialty practice recognition from the National Committee for Quality Assurance.
- A department project involving contact precautions on patient floors resulted in hospital-wide change.
- Quarterly Quality Journal Clubs
- Contests with awards for best quality improvement ideas

Under the direction of Alex Khariton, RTT, MBA, Vice President for Radiation Oncology, the department is defining cost-of-care in novel ways in order to advance the value of delivered care and reduce costs without compromising Jefferson’s outstanding quality.

**On Radiation Oncology Practice Accreditation**

Under Dr. Dicker’s leadership, a major focus in the quality and safety program has been on radiation oncology accreditation, which is still voluntary in our practice environment. Our early efforts in achieving ACR-ASTRO accreditation (American College of Radiology-American Society for Radiation Oncology) led to the development of continued quality improvement processes, as reported by Doyle, et al. in a peer reviewed paper published in the Journal of the American College of Radiology (J Am Coll Radiol. 2016 Jul;13(7):881-3. PMID: 26908397).

As ASTRO launched the new, more quantitative and objective Accreditation Program for Excellence (APEX program), Dr. Yan Yu played a pivotal role in the APEX Working Group, which formulated the standards and evidence indicators of the program, and now co-chairs the ASTRO APEX Committee. In October 2016, Jefferson’s Radiation Oncology Department became one of the first academic programs to receive full accreditation for APEX.
A BRIEF HISTORY OF RADIATION ONCOLOGY AT JEFFERSON

Jefferson has long been a leader in radiation oncology. The timeline below offers highlights of our practice, past and present.

- **1825**: Thomas Jefferson University Hospital founded
- **1901**: X-ray treatments used at Jefferson for cancer and other conditions
- **1932**: Jefferson radiology students receive instruction in "radium therapy"
- **1940s**: Hospital has first fully accredited radiation therapist MD on staff
- **1950s**: First clinical physicist, physics laboratory. Radiation therapy becomes a separate division.
- **1966**: Jefferson has the nation’s first radiation therapy simulator. Department of Radiation Oncology is formally organized in its present form.
1969

1969-1983

SIMON KRAMER, MD

1969 Founding Chair
Led the Department into the modern megavoltage era and created the first independent academic radiation oncology department in the country.

1971 First Chair of the Radiation Therapy Oncology Group (RTOG)

1972 Leader of the Patterns of Care Study (PCS)

1983-1994

CARL MANSFIELD, MD

1987 Bodine Center for Cancer Treatment opens
Raised social awareness for managing and treating the underserved community.
Developed one of the largest breast cancer practices in Philadelphia.

1994

1994-2007

WALTER J. CURRAN, JR., MD

Expanded the Jefferson Cancer Network to include 23 institutional members
Expanded membership in the RTOG significantly.

2007-PRESENT

ADAM P. DICKER, MD, PhD, FASTRO

2008 Acting Chair
2010 Chair
First physician scientist on the faculty to apply benchmark laboratory research in the development of future irradiation strategies.

2016

Appointed Enterprise Senior Vice President and Chair of Radiation Oncology
DEPARTMENT LEADERSHIP
NATIONAL LEADERSHIP POSITIONS

ADAM P. DICKER, MD, PhD, FASTRO
Professor of Radiation Oncology, Pharmacology and Experimental Therapeutics
Enterprise Senior Vice President and Chair, Radiation Oncology
Associate Editor, Editorial Board, ASCO JCO Clinical Cancer Informatics
Editorial Board, ASCO JCO Precision Oncology
Editorial Board, Clinical Cancer Research
Chair, Radiation Oncology Healthcare Advisory Council - Radiation Oncology Incident Learning System, ASTRO-AAPM Patient Safety Organization
Member, American Society for Clinical Oncology, a) Value in Cancer Care Task Force, b) Measures Task Force, c) Choosing Wisely Committee
Member, Investigational Drug Steering Committee, National Cancer Institute-Cancer Treatment Evaluation Program (CTEP)
Member, National Clinical Trial Network Core Correlative Sciences Committee, CTEP
Radiation Oncology Co-Chair, of the NCI Genitourinary Cancers Steering Committee (GUSC)’s Prostate Cancer Task Force
Co-Chair, NRG Oncology, Translational Science Committee
Fellow, American Society of Radiation Oncology (FASTRO)

MARIA WERNER-WASIK, MD, FASTRO
Walter J. Curran Professor of Radiation Oncology
Executive Vice Chair for Radiation Oncology Integration
Editorial Board, Open Lung Cancer Journal
Editorial Board, Nowotwory Journal of Oncology
Chair, Lung Track, Annual ASTRO Scientific Meeting
Chair, Lung Track, Best of ASTRO Annual Meeting
Member, RTOG Foundation Board
Member, NRG Ancillary Analyses Committee
Member, NRG Functional Imaging Working Group
Member, ASTRO Scientific Committee
Member, ASTRO Lung Guidelines Panel
Member, ASTRO Head and Neck Resource Panel
Member, ASTRO Lung Resource Panel
Member, IASLC Advanced Radiation Oncology Therapy Technology Committee
ABR Oral Board Examiner, Radiation Oncology Specialty Board (Lung/ Sarcoma section)
Member of Core Group for Written Boards in Lung/Sarcoma
Fellow, American Society of Radiation Oncology (FASTRO)

YAN YU, PhD, MBA, FASTRO, FAAPM
Professor of Radiation Oncology
Vice Chair, Division of Medical Physics
Honorary Professor, Harbin University of Science and Technology, Harbin, China
Associate Editor, International Journal of Radiation Oncology, Biology, Physics
Section Editor, Journal of Applied Clinical Medical Physics
Guest Associate Editor, Medical Physics
Co-Chair, ASTRO Accreditation Program for Excellence (APEx) Practice Accreditation Committee
Chair, NIH ZRG1 OTC-R(11) Study Section
Chair, AAPM Professional Council Workforce Assessment Committee
Member, AAPM Therapy Practice Accreditation Committee
Member, ASTRO Clinical Affairs and Quality Committee
ABR Oral Board Examiner (Panel Chair, Medical Physics)
Fellow, American Association of Physicists in Medicine (FAAPM)
Fellow, American Society of Radiation Oncology (FASTRO)
MARK D. HURWITZ, MD
Professor, Department of Radiation Oncology
Vice Chair for Quality, Safety and Performance Excellence
Director of Thermal Oncology
Medical Student Clerkship Director
Associate Editor, International Journal of Hyperthermia
Associate Editor, Journal of Cancer Research and Therapeutics
Member, ASTRO Clinical Affairs and Quality Council
Member, Multidisciplinary QA Sub-committee
Member, RTOG Genitourinary Committee and GU Steering Committee
Vice-Chair, CALGB Radiation Oncology Committee, 2001-2011
Past President, Society of Thermal Medicine
Member, Society for Thermal Medicine Finance Committee
Member, Atzelsberg Circle Scientific Study Group for Hyperthermia in Radiation Oncology and Medical Oncology
Member, Program Committee, 2016 International Congress of Hyperthermia Oncology

SCOT A. FISHER, DO
Clinical Professor, Department of Radiation Oncology
Vice Chair for Business Development
Director of Off-Campus Programs
Member, American College of Radiology (ACR), Economic Issues in Academic Radiology Committee (includes Academic Radiation Oncology)
Surveyor for the ACR/ASTRO Practice Accreditation Program for Radiation Oncology

BO LU, MD, PhD
Professor, Department of Radiation Oncology
Director, Division of Molecular Radiation Biology
Board of Directors: Sino-American Network for Therapeutic Radiology and Oncology (SANTRO)
Chair, NCI Lung Cancer Working Group
Member, American Association of Cancer Research (AACR)
Scientific Review Committee
Member, ASTRO Scientific Review Committee
Member, NCI Head & Neck Steering Committee Tumor Biology and Imaging Task Force
Member, American College of Surgical Oncology Group (ACOSOG) Radiation Oncology Committee
Member, ASOCOG Basic Translational Science Committee
Member, SANTRO Board of Directors and Scientific Review Committee
Member, Eastern Cooperative Oncology Group (ECOG) Translational Research Liaison, RTOG Lung Cancer Committee
FELLOWS, AMERICAN SOCIETY FOR RADIATION ONCOLOGY (FASTRO)

Sucha Asbel, MD, FASTRO
Professor, Department of Radiation Oncology
Cooper Medical School of Rowan University

Lawrence Coia, MD, FASTRO
Adjunct Associate Professor, Department of Radiation Oncology
Perelman School of Medicine, University of Pennsylvania
Attending Physician, Southern Ocean Medical Center, Manahawkin, NJ

Lawrence W. Davis, MD, MBA, FASTRO
Professor Emeritus, Emory University
Former Chair, Department of Radiation Oncology, Emory University

Barbara Danoff Fowble, MD, FASTRO
Professor, Department of Radiation Oncology, University of California, San Francisco

James Galvin, DSc, FASTRO
Former Professor, Division of Medical Physics
Department of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Carl Mansfield, MD, DSc, FASTRO
Professor Emeritus and Former Chair, Department of Radiation Oncology
Sidney Kimmel Medical College at Thomas Jefferson University

Jatinder Palta, PhD, FASTRO
National Chief Physicist, Veterans Health Administration

Lawrence Solin, MD, FASTRO
Chair, Department of Radiation Oncology, Albert Einstein Medical Center, Philadelphia

Nagalingam Suntharalingam, PhD, FASTRO
Professor Emeritus and Former Director, Division of Medical Physics,
Department of Radiation Oncology, Sidney Kimmel Medical College at Thomas Jefferson University

Richard Valicenti, MD, FASTRO
Professor and Chair, Department of Radiation Oncology,
University of California, Davis
ASTRO FELLOWS, CURRENT FACULTY

Adam P. Dicker, MD, PhD, FASTRO
Enterprise Senior Vice President and Chair, Radiation Oncology
Professor of Radiation Oncology, Pharmacology and Experimental Therapeutics
Sidney Kimmel Medical College at Thomas Jefferson University

Maria Werner-Wasik, MD, FASTRO
Walter J. Curran Professor of Radiation Oncology, Sidney Kimmel Medical College at Thomas Jefferson University
Executive Vice Chair for Integration, Department of Radiation Oncology, Thomas Jefferson University

Yan Yu, PhD, MBA, FAAPM, FASTRO
Professor of Radiation Oncology, Sidney Kimmel Medical College at Thomas Jefferson University
Vice Chair, Medical Physics Division, Department of Radiation Oncology, Thomas Jefferson University

CHAIRS OF RADIATION ONCOLOGY DEPARTMENTS

Walter J. Curran, Jr., MD
Executive Director, Winship Cancer Institute
Associate Vice President, Cancer, Woodruff Health Sciences Center

Lawrence W. Davis, MD
Professor Emeritus and Former Chair, Emory University

Ralph Dobelbower, MD, PhD
Founding Chair, University of Toledo

Lydia Komarnicky, MD
Chair, Drexel University

Parvesh Kumar, MD
Chair, University of Nevada

James Larner, MD, FASTRO
Chair, University of Virginia

Mitchell Machtay, MD
Chair, Case Western Reserve

Mohammed Mohiuddin, MD
Former Chair, University of Kentucky

William Regine, MD, FACRO
Chair, University of Maryland

*Representative selection
DISTINGUISHED ALUMNI

RADIATION ONCOLOGY RESIDENCY DIRECTORS

Ruben C. Fragoso, MD, PhD
University of California, Davis

Timothy N. Showalter, MD, MPH
University of Virginia

Evan Wuthrick, MD
The Ohio State University

MEDICAL PHYSICS RESIDENCY DIRECTORS

Anthony Doemer, MS, DABR®
Co-Director, Medical Physics Residency Program
Director of Brachytherapy Physics
Henry Ford Hospital

Matthew Studenski, PhD, DABR®
Assistant Professor and Co-Director, Medical Physics Residency Program
Director of Brachytherapy Program, Division of Medical Physics, Department of Radiation Oncology, University of Miami

Tarun Podder, PhD, DABR®
Associate Professor, Director, Residency Program and Director, Clinical Brachytherapy Program, Division of Medical Physics, Department of Radiation Oncology, Case Western Reserve University

ALUMNI IN LEADERSHIP POSITIONS IN MEDICAL PHYSICS

Mohammed Saiful Huq, PhD, DABR®, FAAPM, FInstP
Professor and Director, Medical Physics, Department of Radiation Oncology, University of Pittsburgh Cancer Institute

Chihray R. Liu, PhD
Thomas P. Mitchell Professor of Clinical Physics and Chief Physicist, Department of Radiation Oncology, University of Florida

Vivek Mishra, PhD, DABR®
Director of Medical Physics, Baptist Hospital of Miami

Ning J. Yue, PhD, FAAPM
Professor, Vice Chair and Chief of Physics, Department of Radiation Oncology, Robert Wood Johnson Medical School at Rutgers University

Ying Xiao, PhD
Professor of Radiation Oncology
University of Pennsylvania
## SUMMARY OF PUBLICATIONS

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A leading center for practice-changing discovery and comprehensive cancer treatment, the Sidney Kimmel Cancer Center of the Thomas Jefferson University has been known as a Designated Center by the National Cancer Institute since 1996, and is one of only 69 institutions in the nation to hold this prestigious recognition. SKCC is committed to delivering the most advanced, personalized cancer care, made possible through their scientific discoveries and breakthroughs in detecting and treating cancer. SKCC provides access to advanced clinical trials and novel treatment strategies throughout the Greater Delaware Valley, realized through our integral sites in Center City Philadelphia, Abington, Aria, and the comprehensive Sidney Kimmel Cancer Center Network. Routinely ranked amongst the top hospitals for cancer care in the United States by US News & World Report, the multi-disciplinary teams at SKCC bring together specialists for treatment planning, which results in some of the highest survival rates in the nation.

The Sidney Kimmel Cancer Center supports five major interdisciplinary programs that are organized with the specific intent of translating basic science discoveries into curative therapies for cancer, while minimizing long-term side effects. These programs are a guiding light in the quest to defeat cancer. Science is the foundation of everything we do. Our two core science programs illuminate our discovery and our care through rigorous analysis of the cellular biology and genetic underpinnings of each person and each cancer. Our three disease-oriented programs focus on prostate cancer, breast cancer and gastrointestinal cancer.

Lastly, our strong population science program is expanding by leaps and bounds. We will be able to determine patterns and trends of cancer incidence and mortality and then conduct rigorous, dot-connecting studies to identify additional risk factors for cancer knowledge that will benefit all of society.

Doctors have always recognized that every patient is unique, and have always tried to tailor their treatments to individuals as best they can. We combine all these amazing things we are doing to fight this cancer battle and incorporate our Precision Medicine initiatives with Foundation Medicine by giving our patients:

**The right therapy**
**For the right patient**
**At the right time**
**At the right dose**
**For the right duration.**

And we will continue to be a leader in cancer research, care and prevention for the foreseeable future.
The state-of-the-art cancer center was developed in partnership with the Sidney Kimmel Cancer Center at Jefferson and Abington - Jefferson Health. The partnership benefits more than 90,000 residents of Abington’s service area who have been diagnosed with cancer and require screening, survivorship care and other services. Located on Abington - Jefferson Health’s Willow Grove campus, the pavilion will offer a full spectrum of care, including highly advanced radiation therapy technology and shorter treatments based on the latest research, much of it from Jefferson experts. Abington’s Cancer program is fully integrated with Jefferson’s National Cancer Institute (NCI)-designated Sidney Kimmel Cancer Center, one of just 69 NCI-designated cancer centers in the nation.
WE IMPROVE LIVES.

Thomas Jefferson University and Sidney Kimmel Cancer Center at Jefferson
Philadelphia, PA

Jefferson.edu