

**Curriculum Vitae**  
Amit Sawant, Ph.D.  
Associate Professor, Department of Radiation Oncology  
University of Maryland, Baltimore, MD

**Date** August 25, 2016

## **Contact Information**

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Foreign Languages: Hindi (fluent), Marathi (native)

## Education

1996 Bachelor of Engineering (Honors) in Biomedical Engineering, University of Mumbai, India  
1999 M.S., Biomedical Engineering, University of Tennessee, Memphis  
2006 Ph.D., Biomedical Engineering, University of Michigan, Ann Arbor,  
Thesis Advisor—Larry Antonuk,  
*“High Quantum Efficiency Segmented Detectors for Megavoltage X-Ray Imaging  
Using Indirect Detection Active Matrix Flat Panel Imagers”*

## **Post Graduate Education and Training**

2006-2008 Postdoctoral Fellowship, Stanford University, Stanford, CA

## **Employment History**

**University of Maryland, Baltimore**

*Associate Professor, Department of Radiation Oncology*

Jan 2016 – present

## *Division of Translational Radiation Sciences and Division of Physics*

- Leading the effort on translational pre-clinical research based on the small animal image-guided radiotherapy platform
- Initiated an integrative program between Radiobiology, Physics and the Clinical Sciences to develop and translate physics-driven projects into eventual clinical studies

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**University of Texas, Southwestern Medical Center, Dallas**

*Assistant Professor, Department of Radiation Oncology*  
*Assistant Professor, Department of Radiology*

Oct 2010 – Dec 2015  
Mar 2014 – Dec 2015

- Developed a multidisciplinary research program on 4D image-guided motion management for real-time adaptive lung stereotactic body radiotherapy (SBRT), involving three academic and three industrial partners
- Secured, as principal investigator, over \$5.5 million in extramural research funding, including two NIH R01 awards
- Initiated clinical programs on Vision RT-guided deep inspiration breath-hold (DIBH) breast treatments and head and neck treatments
- Serving as Principal Investigator on two IRB-approved non-therapeutic clinical protocols
- Led outreach efforts and formed multidisciplinary collaborations with research faculty in Radiology, Radiobiology (UT Southwestern), Electrical Engineering and Computer Science (U of Utah, UT Dallas)
- Serving as lead organizer for the UTSW technical and translational research (T2R2) seminar series which invites thought leaders in physics, imaging, and radiobiology to facilitate benchtop-to-bedside translation of novel technologies in Radiation Oncology

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**Stanford University**

*Instructor, Department of Radiation Oncology*  
*Post-doctoral Research Fellow, Department of Radiation Oncology*

Oct 2008 – Oct 2010  
Jul 2006 – Oct 2008

- Developed and translated, on the Varian platform, the first dynamic MLC-based real-time tracking system capable of following 3D motion of thoracic and abdominal tumors.
- Integrated MLC tracking with external and internal marker-based position monitoring systems
- Developed a novel quality assurance framework for MLC tracking, based on failure mode and effect analysis (FMEA)
- Investigated real-time MRI as a non-invasive volumetric image-guidance modality for IGRT delivery
- Designed and set up benchtop MLC lab at Stanford, made purchasing decisions and performed installation and maintenance of software
- Served as a key investigator on two industrial-academic projects

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**University of Michigan, Department of Radiation Oncology**

*Graduate Research Assistant*

Apr 2001 – Jun 2006

- Developed high quantum efficiency, flat panel, megavoltage x-ray imagers capable of over 22 times higher imaging performance than current clinical devices
- Developed sophisticated theoretical tools using Monte Carlo simulations and linear systems modeling for the analysis of direct and indirect detection-based radiographic, fluoroscopic and megavoltage imaging systems
- Developed tools for the empirical characterization of high efficiency megavoltage x-ray imagers

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**St. Jude Children's Research Hospital, Department of Radiation Oncology**

*Scientific Programmer*

Oct 1999 – Apr 2001

- Developed and optimized a novel CCD camera-based megavoltage x-ray imaging system
- Developed and maintained software for a 3D radiation treatment planning system
- Developed a simulated annealing-based algorithm to generate parametric images from dynamic contrast-enhanced MRI images

**University of Tennessee, Department of Biomedical Engineering**

*Graduate Research Assistant*

Oct 1997–Oct 1999

- Developed a transparent scintillator-based, high efficiency megavoltage x-ray imaging system
- Performed theoretical analysis of the system using Monte Carlo simulations
- Developed image processing tools and software for the above system

**Professional Society Membership**

2009-2011 Member, International Society for Magnetic Resonance in Medicine (ISMRM)

2003-present Member, American Association of Physicists in Medicine (AAPM)

2008-present Member, American Society of Therapeutic Radiation Oncologists (ASTRO)

2016 – present Member, Radiation Research Society (RRS)

**Honors And Awards**

1999	UT School of Biomedical Engineering, Student Travel Award to attend and present at the SPIE 1999, Medical Imaging Conference, San Diego.
2004	First place in the John R. Cameron Young Investigator Competition at the 2004 AAPM annual meeting for oral presentation entitled " <i>Empirical Investigation of a New Generation of High QE Detectors for Active Matrix Flat-Panel Imager EPIDs</i> "
2006	Nominated for the University of Michigan, Rackham School's Distinguished Dissertation Award.
2007	Second place in the Young Investigator Competition at the XVth ICCR meeting (2007) in Toronto, Canada, for oral presentation entitled " <i>A Generalized Method for 3D Tracking of Intrafraction Tumor Motion Using a Dynamic Multileaf Collimator</i> "
2008	ASTRO 2008 Basic Science Research Grant Award for presentation entitled " <i>Geometric Accuracy and Latency of an Integrated 4D IMRT Delivery System using Real-Time Internal Position Monitoring and Dynamic MLC Tracking</i> "
2010	Selected for The John S. Laughlin Science Council Research Symposium at the 2010 AAPM annual meeting for oral presentation entitled " <i>Real-Time MRI for Soft-Tissue-Based IGRT of Moving and Deforming Lung Tumors</i> "
2014	Selected for the BEST IN PHYSICS (Therapy) category at the 2014 AAPM annual meeting for oral presentation entitled " <i>4D IMRT Planning Using Highly-Parallelizable Particle Swarm Optimization</i> "

2015      Selected for the BEST IN PHYSICS category at the 2015 ASTRO annual meeting for oral presentation entitled “*Dose Response Relationship for Stereotactic Ablative Body Radiation Therapy Associated Airway Collapse.*”

2016      Selected for the BEST IN PHYSICS (Joint Imaging-Therapy) category at the 2016 AAPM annual meeting for oral presentation entitled “*An MRI Compatible Externally and Internally Deformable Lung Motion Phantom for Multi-Modality IGRT*”

### **Clinical Activities**

Performed commissioning and acceptance of VisionRT (VRT) position monitoring systems. Trained physicists and therapists on operation and updated features of the VRT system. Initiated clinical programs on Vision RT-guided deep inspiration breath-hold (DIBH) breast radiotherapy and head and neck radiotherapy at the UT Southwestern Medical Center (UTSW). These VisionRT-based procedures replaced the older ABC-guided DIBH, resulting in significant savings (>50%) in patient treatment time.

Served as Principal Investigator on two and co-I two on IRB-approved non-therapeutic clinical protocols at UTSW. Currently, PI on two clinical protocols at Univ of Maryland, under IRB review.

### **Administrative Service**

#### **Institutional Service**

2011-2015    Member, Master Planning Committee, New UTSW Conventional Radiotherapy Center: Motion Management sub-Committee; and Mobile Technologies sub-Committee

2011-2015    Member, Disease Oriented Teams (DoTs): Lung, GU, Breast

2012-2015    Organizer, Visiting Professor Series at UTSW entitled Technical and Translational Research in Radiotherapy (T2R2)

#### **Local and National Service**

##### **National Service**

2005-present    Reviewer, “*Medical Physics Journal*” (8/yr)

2007-present    Reviewer, “*Physics in Medicine and Biology Journal*” (2/yr)

2008-present    Reviewer, “*International Journal of Radiation Oncology Biology and Physics*” (~#2-3/yr)

2010-2013      Associate Editor, Medical Physics Journal

2014-present     Member, Task Group TG 264 - Safe Clinical Implementation of MLC Tracking in Radiotherapy, American Association of Physicists in Medicine (AAPM)

2015              Organizer and Co-Moderator, “Academic-Industrial Research and Development Partnerships-Nuts and Bolts, Pitfalls and Rewards”, American Association of

Physicists in Medicine (AAPM) 2015 Annual Meeting. *Session selected as AAPM President's choice for the year's conference theme-Reinvigorating Scientific Excellence*

- 2016-present Member, Research Committee, AAPM
- 2016-present Member, Imaging for Treatment Verification Work Group, AAPM
- 2016-present Member, Editorial board, Medical Physics Journal

### **Teaching Service**

#### **Resident and Fellow Teaching**

- 2007-2008 Mentor, Srinidhi Kondaji, ME, Electrical Engineering, Stanford University, 4 hrs/wk
- 2008 Mentor, Matt Noll, AAPM Undergrad Fellow, MS, Physics, Stanford University, 4 hrs/wk
- 2009-2010 Mentor, Cheolpyo Hong, Visiting Scholar from Younsei University, Stanford University, 6 hrs/wk
- 2011 Mentor, UT Southwestern Medical Center:  
Yasser Ghanbari, Postdoctoral Fellow, 3 hrs/wk  
Don Bigler, Postdoctoral Fellow, 3 hrs/wk
- 2011-2012 Mentor, Hidenobu Tachibana, Assistant Instructor, UT Southwestern Medical Center, 2 hrs/wk
- 2012-2013 Mentor, Bin Xie, Assistant Instructor, UT Southwestern Medical Center, 3 hrs/wk
- 2012-2014 Mentor, Yam Cheung, Postdoctoral Fellow, UT Southwestern Medical Center, 4 hrs/wk
- 2013-present Mentor, Arezoo Modiri, Postdoctoral Fellow, UT Southwestern Medical Center; Instructor, University of Maryland, Baltimore, 2 hrs/wk
- 2014-2015 Mentor, UT Southwestern Medical Center:  
Ross Bland, Radiation Oncology Resident, 1 hr/wk  
Tatsuya Arai, Postdoctoral Fellow, 3 hrs/wk  
Douglas Moore, Postdoctoral Fellow, 2 hrs/wk
- 2015-present Mentor, Pouya Sabouri, Postdoctoral Fellow, UT Southwestern Medical Center; University of Maryland, Baltimore, 3 hrs/wk

## **Post-Graduate Teaching**

2008-2009 Instructor, Stanford University, Image-Guided Radiation Therapy (IGRT)  
Short Course, 1 hr lecture in annual IGRT course, given to clinical medical  
physicists

2014-2015 Lecturer, UTSW Postdoctoral Training Program in Medical Physics, 6 – 9  
postdoctoral fellows, 15 lectures (1.5 hrs each) per year

## **Grant Support**

### **Active/Pending Grants:**

09/01/13 - 06/30/18 (PI: 40%)  
“*Personalized Motion Management for truly 4D Lung Stereotactic Body Radiotherapy*”  
NIH R01CA169102  
Annual Direct Costs: \$378,562  
Total Direct Costs: \$2,006,669

08/01/16 - 07/31/21 (PI: 35%)  
“*Investigating Radiation Injury to Airways and Pulmonary Vasculature in Lung SBRT*”  
NIH R01 CA202761-01  
Annual Direct Costs: \$497,740  
Total Direct Costs: \$2,488,701

### **Completed Grants:**

02/01/15-01/30/17 (PI: 3%)  
“*Dynamic MLC tracking using real-time Vision RT-based guidance for lung SBRT*”  
VisionRT  
Annual Direct Costs: \$51,000 (indirects were waived)  
Total Direct Costs: \$102,000

12/01/12-11/30/15 (PI: 30%)  
“*Comprehensive Four-Dimensional Motion-Adaptive Lung SBRT*”  
Varian Medical Systems  
Annual Direct Costs: \$100,747  
Total Direct Costs: \$402,985

02/01/15 - 12/31/16	(PI: 3%) “ <i>Multimodality Patient-Specific Motion Models Using Surface Photogrammetry, Cine CT and Rapid MRI</i> ” VisionRT Annual Direct Costs: \$76,021 Total Direct Costs: \$201,732
03/01/14 - 12/31/15	(PI: 3%) “ <i>Real-time tracking of lung tumors using the Agility MLC</i> ” Elekta Annual Direct Costs: \$64,947 Total Direct Costs: \$263,230

### Patents and Invention Disclosures

2007 P. Keall, R. Venkat, **A. Sawant**, B. Loo, P. Maxim and F. van den Haak. *An integrated patient positioning and audiovisual biofeedback system for thoracic and abdominal imaging and radiotherapy*. Invention disclosure filed.

2009 D. Ruan, P. Keall and **A. Sawant**. *Method and system for real-time DMLC-based target tracking with optimal leaf sequencing*. Invention disclosure filed.

2009 P. Poulsen, B. Cho, P. Keall, **A. Sawant** and D. Ruan. *A method to estimate real-time 3D target position utilizing gantry-mounted x-ray imaging systems of a linear accelerator and external respiratory monitoring system*. Invention disclosure filed.

2009 P. Keall; J. Berger; U. Geva; R. Venkat; **A. Sawant**; S. Gopalan; D. Siwiak. *Audio and visual biofeedback for self-controlling breathing patterns*. Invention disclosure filed.

2009 P. Keall, **A. Sawant**, Y. Suh, S. Povzner and H. Cattell, *Method to track three-dimensional target motion with a dynamical multi-leaf collimator*, **United States Patent 7469035**.

2013 Rebecca Fahrig, Norbert J. Pelc, Kim Pauly, Greig C. Scott, Amit Sawant, Paul J. Keall, Lei Xing, Steven M. Conolly. *Configurations for integrated MRI-linear accelerators*. **United States Patent 2010/0239066 A1**.

2014 P. Keall, **A. Sawant**, P. Maxim, Y. Suh, L. Xing, B. Loo, and B. Cho, *Method and apparatus for real-time 3D target position estimation by combining single x-ray imaging and external respiratory signals*, **United States Patent US 8,849,373 B2**.

## **Publications**

### **Peer-Reviewed Journal Articles**

- 1 A. Sawant, H. Zeman, S. Samant, G. Lovhoiden, B. Weinberg, F. DiBianca, "Theoretical analysis and experimental evaluation of a CsI(Tl) based electronic portal imaging system," *Med Phys* **29**, 1042-1053 (2002).
- 2 Y.X. Kang, L.E. Antonuk, Y. El-Mohri, L. Hu, Y.X. Li, A. Sawant, Z. Su, Y. Wang, J. Yamamoto, Q.H. Zhao, "Examination of PbI<sub>2</sub> and HgI<sub>2</sub> photoconductive materials for direct detection, active matrix, flat-panel imagers for diagnostic X-ray imaging," *Ieee T Nucl Sci* **52**, 38-45 (2005).
- 3 A. Sawant, L.E. Antonuk, Y. El-Mohri, Y. Li, Z. Su, Y. Wang, J. Yamamoto, Q. Zhao, H. Du, J. Daniel, R. Street, "Segmented phosphors: MEMS-based high quantum efficiency detectors for megavoltage x-ray imaging," *Med Phys* **32**, 553-565 (2005).
- 4 A. Sawant, L.E. Antonuk, Y. El-Mohri, Q. Zhao, Y. Li, Z. Su, Y. Wang, J. Yamamoto, H. Du, I. Cunningham, M. Klugerman, K. Shah, "Segmented crystalline scintillators: an initial investigation of high quantum efficiency detectors for megavoltage x-ray imaging," *Med Phys* **32**, 3067-3083 (2005).
- 5 Z. Su, L.E. Antonuk, Y. El-Mohri, L. Hu, H. Du, A. Sawant, Y. Li, Y. Wang, J. Yamamoto, Q. Zhao, "Systematic investigation of the signal properties of polycrystalline HgI<sub>2</sub> detectors under mammographic, radiographic, fluoroscopic and radiotherapy irradiation conditions," *Phys Med Biol* **50**, 2907-2928 (2005).
- 6 Y.X. Li, L.E. Antonuk, Y. El-Mohri, Q.H. Zhao, H. Du, A. Sawant, Y. Wang, "Effects of X-ray irradiation on polycrystalline silicon, thin-film transistors," *J Appl Phys* **99**2006).
- 7 A. Sawant, L.E. Antonuk, Y. El-Mohri, Q. Zhao, Y. Wang, Y. Li, H. Du, L. Perna, "Segmented crystalline scintillators: empirical and theoretical investigation of a high quantum efficiency EPID based on an initial engineering prototype CsI(Tl) detector," *Med Phys* **33**, 1053-1066 (2006).
- 8 J.H. Daniel, A. Sawant, M. Teepe, C. Shih, R.A. Street, L.E. Antonuk, "Fabrication of high aspect-ratio polymer microstructures for large-area electronic portal x-ray imagers," *Sens Actuators A Phys* **140**, 185-193 (2007).
- 9 Y. El-Mohri, L.E. Antonuk, Q. Zhao, Y. Wang, Y. Li, H. Du, A. Sawant, "Performance of a high fill factor, indirect detection prototype flat-panel imager for mammography," *Med Phys* **34**, 315-327 (2007).
- 10 A. Sawant, L. Antonuk, Y. El-Mohri, "Slit design for efficient and accurate MTF measurement at megavoltage x-ray energies," *Med Phys* **34**, 1535-1545 (2007).
- 11 A. Sawant, R. Venkat, V. Srivastava, D. Carlson, S. Povzner, H. Cattell, P. Keall, "Management of three-dimensional intrafraction motion through real-time DMLC tracking," *Med Phys* **35**, 2050-2061 (2008).
- 12 R.B. Venkat, A. Sawant, Y. Suh, R. George, P.J. Keall, "Development and preliminary evaluation of a prototype audiovisual biofeedback device incorporating a patient-specific guiding waveform," *Phys Med Biol* **53**, N197-208 (2008).
- 13 Y. Wang, L.E. Antonuk, Y. El-Mohri, Q. Zhao, A. Sawant, H. Du, "Monte Carlo investigations of megavoltage cone-beam CT using thick, segmented scintillating detectors for soft tissue visualization," *Med Phys* **35**, 145-158 (2008).

14 B. Cho, P.R. Poulsen, A. Sloutsky, A. Sawant, P.J. Keall, "First demonstration of combined kV/MV image-guided real-time dynamic multileaf-collimator target tracking," *Int J Radiat Oncol Biol Phys* **74**, 859-867 (2009).

15 A. Sawant, R.L. Smith, R.B. Venkat, L. Santanam, B. Cho, P. Poulsen, H. Cattell, L.J. Newell, P. Parikh, P.J. Keall, "Toward submillimeter accuracy in the management of intrafraction motion: the integration of real-time internal position monitoring and multileaf collimator target tracking," *Int J Radiat Oncol Biol Phys* **74**, 575-582 (2009).

16 R.L. Smith, A. Sawant, L. Santanam, R.B. Venkat, L.J. Newell, B.C. Cho, P. Poulsen, H. Cattell, P.J. Keall, P.J. Parikh, "Integration of real-time internal electromagnetic position monitoring coupled with dynamic multileaf collimator tracking: an intensity-modulated radiation therapy feasibility study," *Int J Radiat Oncol Biol Phys* **74**, 868-875 (2009).

17 Y. Suh, A. Sawant, R. Venkat, P.J. Keall, "Four-dimensional IMRT treatment planning using a DMLC motion-tracking algorithm," *Phys Med Biol* **54**, 3821-3835 (2009).

18 J. Zimmerman, S. Korreman, G. Persson, H. Cattell, M. Svatos, A. Sawant, R. Venkat, D. Carlson, P. Keall, "DMLC motion tracking of moving targets for intensity modulated arc therapy treatment: a feasibility study," *Acta Oncol* **48**, 245-250 (2009).

19 M. Falk, P. Munck af Rosenschold, P. Keall, H. Cattell, B.C. Cho, P. Poulsen, S. Povzner, A. Sawant, J. Zimmerman, S. Korreman, "Real-time dynamic MLC tracking for inversely optimized arc radiotherapy," *Radiother Oncol* **94**, 218-223 (2010).

20 P.R. Poulsen, B. Cho, D. Ruan, A. Sawant, P.J. Keall, "Dynamic multileaf collimator tracking of respiratory target motion based on a single kilovoltage imager during arc radiotherapy," *Int J Radiat Oncol Biol Phys* **77**, 600-607 (2010).

21 P.R. Poulsen, B. Cho, A. Sawant, P.J. Keall, "Implementation of a new method for dynamic multileaf collimator tracking of prostate motion in arc radiotherapy using a single kV imager," *Int J Radiat Oncol Biol Phys* **76**, 914-923 (2010).

22 P.R. Poulsen, B. Cho, A. Sawant, D. Ruan, P.J. Keall, "Detailed analysis of latencies in image-based dynamic MLC tracking," *Med Phys* **37**, 4998-5005 (2010).

23 P.R. Poulsen, B. Cho, A. Sawant, D. Ruan, P.J. Keall, "Dynamic MLC tracking of moving targets with a single kV imager for 3D conformal and IMRT treatments," *Acta Oncol* **49**, 1092-1100 (2010).

24 A. Sawant, S. Dieterich, M. Svatos, P. Keall, "Failure mode and effect analysis-based quality assurance for dynamic MLC tracking systems," *Med Phys* **37**, 6466-6479 (2010).

25 Q. Zhao, L.E. Antonuk, Y. El-Mohri, Y. Wang, H. Du, A. Sawant, Z. Su, J. Yamamoto, "Performance evaluation of polycrystalline HgI<sub>2</sub> photoconductors for radiation therapy imaging," *Med Phys* **37**, 2738-2748 (2010).

26 B. Cho, P.R. Poulsen, A. Sawant, D. Ruan, P.J. Keall, "Real-time target position estimation using stereoscopic kilovoltage/megavoltage imaging and external respiratory monitoring for dynamic multileaf collimator tracking," *Int J Radiat Oncol Biol Phys* **79**, 269-278 (2011).

27 P.J. Keall, A. Sawant, B. Cho, D. Ruan, J. Wu, P. Poulsen, J. Petersen, L.J. Newell, H. Cattell, S. Korreman, "Electromagnetic-guided dynamic multileaf collimator tracking enables motion management for intensity-modulated arc therapy," *Int J Radiat Oncol Biol Phys* **79**, 312-320 (2011).

28 J.W. Yoon, A. Sawant, Y. Suh, B.C. Cho, T.S. Suh, P. Keall, "Experimental investigation of a moving averaging algorithm for motion perpendicular to the leaf travel direction in dynamic MLC target tracking," *Med Phys* **38**, 3924-3931 (2011).

29 B. Cho, P. Poulsen, D. Ruan, A. Sawant, P.J. Keall, "Experimental investigation of a general real-time 3D target localization method using sequential kV imaging combined with respiratory monitoring," *Phys Med Biol* **57**, 7395-7407 (2012).

30 S.S. Iyengar, X. Li, H.H. Xu, S. Mukhopadhyay, N. Balakrishnan, A. Sawant, P. Iyengar, "Toward More Precise Radiotherapy Treatment of Lung Tumors," *Computer* **45**, 59-65 (2012).

31 P.R. Poulsen, J. Carl, J. Nielsen, M.S. Nielsen, J.B. Thomsen, H.K. Jensen, B. Kjaergaard, P.R. Zepernick, E. Worm, W. Fledelius, B. Cho, A. Sawant, D. Ruan, P.J. Keall, "Megavoltage image-based dynamic multileaf collimator tracking of a NiTi stent in porcine lungs on a linear accelerator," *Int J Radiat Oncol Biol Phys* **82**, e321-327 (2012).

32 J. Wu, D. Ruan, B. Cho, A. Sawant, J. Petersen, L.J. Newell, H. Cattell, P.J. Keall, "Electromagnetic detection and real-time DMLC adaptation to target rotation during radiotherapy," *Int J Radiat Oncol Biol Phys* **82**, e545-553 (2012).

33 A. Sawant, P. Keall, K.B. Pauly, M. Alley, S. Vasanawala, B.W. Loo, Jr., J. Hinkle, S. Joshi, "Investigating the feasibility of rapid MRI for image-guided motion management in lung cancer radiotherapy," *Biomed Res Int* **2014**, 485067 (2014).

34 Y. Cheung, A. Sawant, "An externally and internally deformable, programmable lung motion phantom," *Med Phys* **42**, 2585-2593 (2015).

35 W. Liu, Y. Cheung, P. Sabouri, T.J. Arai, A. Sawant, D. Ruan, "A continuous surface reconstruction method on point cloud captured from a 3D surface photogrammetry system," *Med Phys* **42**, 6564-6571 (2015).

36 J. Nofiele, Q. Yuan, M. Kazem, K. Tatebe, Q. Torres, A. Sawant, I. Pedrosa, R. Chopra, "An MRI-compatible platform for one-dimensional motion management studies in MRI," *Magn Reson Med* **2015**.

37 T.J. Arai, J. Nofiele, A.J. Madhuranthakam, Q. Yuan, I. Pedrosa, R. Chopra, A. Sawant, "Characterizing spatiotemporal information loss in sparse-sampling-based dynamic MRI for monitoring respiration-induced tumor motion in radiotherapy," *Med Phys* **43**, 2807 (2016).

38 W. Liu, Y. Cheung, A. Sawant, D. Ruan, "A robust real-time surface reconstruction method on point clouds captured from a 3D surface photogrammetry system," *Med Phys* **43**, 2353 (2016).

39 W. Liu, A. Sawant, D. Ruan, "Prediction of high-dimensional states subject to respiratory motion: a manifold learning approach," *Phys Med Biol* **61**, 4989-4999 (2016).

40 A. Modiri, X. Gu, A. Hagan, A. Sawant, "Radiotherapy Planning Using an Improved Search Strategy in Particle Swarm Optimization," *IEEE Trans Biomed Eng* **2016**.

41 D. Moore, D. Ruan, A. Sawant, "Fast leaf-fitting with generalized underdose/overdose constraints for real-time MLC tracking," *Med Phys* **43**, 465 (2016).

42 H. Tachibana, A. Sawant, "Four-dimensional planning for motion synchronized dose delivery in lung stereotactic body radiation therapy," *Radiother Oncol* **119**, 467-472 (2016).

43. A. Modiri, X. Gu, A. Hagan, R. Bland, P. Iyengar, R. Timmerman, A. Sawant, "Inverse 4D conformal planning for lung SBRT using particle swarm optimization," *Physics in Medicine and Biology*, Accepted for publication, July 2016.

## **Non-Peer Reviewed Articles**

1. Huanhuan Xu; Peizhi Chen; Wuyi Yu; **Sawant, A.**; Iyengar, S.S.; Xin Li, "Feature-aligned 4D spatiotemporal image registration," *Pattern Recognition (ICPR), 2012 21st International Conference on* , vol., no., pp.2639,2642, 11-15 Nov. 2012.
2. Balasubramanian, A.; Prabhakaran, B.; **Sawant, A.**, "Mining pattern sequences in respiratory tumor motion data," *Engineering in Medicine and Biology Society (EMBC), 2012 Annual International Conference of the IEEE* , vol., no., pp.5262,5265, Aug. 28 2012-Sept. 1 2012.
3. **A. Sawant**, V Srivastava, R. Venkat, H. Cattell, S. Povzner and P. Keall: A generalized method for 3D tracking of intrafraction tumor motion using a dynamic multileaf collimator, *Proc. ICCR-2007, XVth International Conference on the Use of Computers in Radiation Therapy*, Vol II. 481-485 (2007).
4. Y. Wang, L.E. Antonuk, Y. El-Mohri, **A. Sawant**, Q. Zhao, H. Du and Y. Li, Theoretical investigation of very high quantum efficiency, segmented, crystalline detectors for low-contrast visualization in megavoltage cone-beam CT, *Proc SPIE[61421-1]*, (2006).
5. **A. Sawant**, L.E. Antonuk, Y. El-Mohri, Y. Kang, Y. Li, Z. Su, Y. Wang, J, Yamamoto and Q. Zhao, Exploring New Frontiers in X-ray Quantum Limited Portal Imaging Using Active Matrix Flat-panel Imagers (AMFPIs), *Proc SPIE [5030-478]*, (2003).
6. **A. Sawant**, J. Reece and W. Reddick, Pharmacokinetic modeling of dynamic MR images using simulated annealing based optimization, *Proc SPIE [3978-29]*, (2000).
7. **A. Sawant**, H. Zeman, D. Muratore, S. Samant and F. DiBianca: An Adaptive Median Filter Algorithm to remove Impulse Noise in X-ray and CT Images and Speckle in Ultrasound Images, *Proc SPIE [3661-132]*, (1999).

## **Major Invited Speeches**

### Local

1. **A. Sawant**, "Role of MRI in Thoracic and Abdominal Radiotherapy Motion Management", **Invited lecture** at the Department of Radiology Grand Rounds, University of Maryland, 2016.
2. **A. Sawant**, "Motion-Adaptive 4D Radiation Therapy" **Invited lecture** at UT Dallas for class CS/CE 4v95 - Tele-medicine and Health-care Data Analytics, Department of Computer Science, Feb 2013.
3. **A. Sawant**, "Motion-Adaptive 4D Radiation Therapy" **Invited lecture** at UT Dallas for class CS/CE 4v95 - Tele-medicine and Health-care Data Analytics, Department of Computer Science, Feb 2013.

National

4. **A. Sawant**, "Imaging and Image Guidance in Lung Cancer Therapeutics" **Invited talk** at the 4th IEEE International Conference on Computational Advances in Bio and Medical Sciences (ICCABS), Miami, FL, June 2014.
5. **A. Sawant**, "Current Experience and Future Outlook in the use of 4DRT for Lung Malignancy" **Invited talk** at the 6th International Workshop for Pulmonary Functional Imaging, Madison, WI, July 2013.
6. **A. Sawant**, "MRI-Guided 4D Adaptive Radiotherapy" **Invited talk** at the Annual Meeting of the Texas Radiological Society in San Antonio, TX, 2012.
7. **A. Sawant**, "Closing the Loop(holes) in Motion Adaptive 4D Radiotherapy" **Invited talk** at the Fall Meeting of the Missouri River Valley Chapter of the American Association of Physicists in Medicine, Oct 2012.
8. **A. Sawant**, "Rapid MRI: 4D Glasses For Radiotherapy Motion Management" **Invited talk** at the Summer Meeting of the New England Chapter of the American Association of Physicists in Medicine, June 2011.
9. **A. Sawant**, "4D Image-Guided Radiotherapy for Lung Cancer" **Invited talk** at Louisiana State University, LA, Feb 2011.
10. K Butts Pauly, **A Sawant**, R. Fahrig and P Keall, "MR Imaging for Real-Time Radiotherapy Guidance" **Invited talk** at the AAPM 2009 annual conference in Anaheim, CA, abstract in Med. Phys. **36**, 2774 (2009).
11. P. Keall, B. Cho, S. Dieterich, P. Poulsen, D. Ruan, **A. Sawant**, Y. Suh, "Locating and Targeting Moving Tumors with Radiation Beams" **Invited talk** at the AAPM 2009 annual conference in Anaheim, CA, Therapy Panel Session: The Management of Motion: Technologies and Practical Limitations, abstract in Med. Phys. **36**, 2753 (2009).
12. P Keall and **A Sawant**, Intra-Fraction Target-Beam Positioning, **Invited talk** at the Joint Imaging/Therapy Symposium, AAPM conference in Minneapolis, MN, July 22 - 26, 2007, abstract in Med. Phys. **34**, 2530 (2007).
13. **A. Sawant**, Real-time Tracking of Tumor Motion in Three Dimensions using a Dynamic Multileaf Collimator, **Invited Talk** at the Real-time Motion Adaptive Radiation Therapy Workshop, Leavey Center, Georgetown University 11-12 May 2007.
14. Antonuk LE, El-Mohri Y, Zhao Q, Su Z, Yamamoto J, Du H, **A. Sawant**, Li Y, Wang Y, Street R, Lu JP: Investigation of Strategies to Achieve Optimal DQE Performance from Indirect-Detection Active-Matrix Flat-Panel Imagers (AMFPIs) through Novel Pixel Amplification Architectures. SPIE Medical Imaging 2005 - Physics of Medical Imaging, San Diego, CA, February 12 - 17, 2005. (Abstract and **invited presentation**.)

International

15. **A. Sawant**, "MRI for Motion Management in Radiation Therapy", **Invited talk** at the ISMRM 23rd Annual Meeting & Exhibition, June 2015, Toronto, Ontario, Canada.

16. **A. Sawant**, “Real-time 4D Radiotherapy for Moving and Deforming Tumors” **Invited talk** at the Fifth International Symposium on Medical Bio- and Nano Electronics, Sendai, Japan, Feb (2010).