

# Gregory C. Sharp

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8 Leather Lane  
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## Education and Appointments

- 2018-present Harvard Medical School, Associate Professor, Radiation Oncology, Massachusetts General Hospital.
- 2008-2018 Harvard Medical School, Assistant Professor, Radiation Oncology, Massachusetts General Hospital.
- 2004-2008 Harvard Medical School, Instructor, Radiation Oncology, Massachusetts General Hospital.
- 2002-2004 Harvard Medical School, Postdoctoral Research Fellow, Radiation Oncology, Massachusetts General Hospital.
- 1997-2002 University of Michigan, Doctor of Philosophy, Electrical Engineering and Computer Sciences.  
Thesis advisor: Sang Wook Lee  
Thesis topic: "Automatic and Stable Multiview 3D Surface Registration."
- 1998-2002 University of Michigan, Master of Science, Mathematics.
- 1995-1996 University of Wisconsin, Master of Science, Computer Sciences.
- 1985-1991 University of Wisconsin, Bachelor of Science, Electrical Engineering.

## Employment

- 2018-present Associate Radiation Biophysicist, Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts.
- 2004-2018t Assistant Radiation Biophysicist, Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts.  
Board certified in Medical Physics (ABR, 2011).  
Lead physicist for thoracic radiation therapy (2010-).  
Lead physicist for image-guided radiation therapy (2008-).  
Clinical experience with Varian and Elekta linear accelerators; SBRT; CT

simulation; 4D-CT simulators; on-board imaging; CBCT; EPID; respiratory gating; radiation measurement; robotic positioning; quality assurance; software automation; DICOM; Mosaiq OIS.

Research: image registration; image segmentation; image-guided radiotherapy, motion management; cone-beam CT; 4D-CT; parallel computing; software reliability and testing.

Administrative: thoracic clinical collaborative committee co-chair (2010-), proton accelerator architectural oversight committee (2014-); ACR accreditation committee (2013-); physics policy committee (2015-2016); proton accelerator executive committee (2013-2014); proton accelerator selection committee (2012-2014); paperless task force (2008-2010).

- 2002-2004 Research Fellow, Department of Radiation Oncology, Massachusetts General Hospital, Boston, Massachusetts.  
Research and clinical implementation of image guided radiation therapy. Development of fluoroscopic guided respiratory gating for the IRIS system. Real-time imaging and tracking. Prediction of organ motion. Software reliability and testing. Deformable image registration.
- 1998-2002 Research Assistant, University of Michigan, Ann Arbor, Michigan.  
Computer vision and robotics research. Research surface registration methods for constructing three-dimensional models from range data for building facility maps in hazardous environment. Research methods in applied mathematics for solving large-scale multiview registration problems. Design custom range image acquisition hardware, calibration software, and registration software. Research empirical models for photometry in image-based rendering.
- 1992-1995 System Engineer, Intergraph Japan, Product Development Dept., Tokyo, Japan.  
Product development. Develop and maintain Japanese versions of commercial PC and UNIX software products, including Microstation (3D surface CAD), I/EMS (3D solid CAD), PC-NFS (networking), ModelView (ray tracing), and I/RAS (scanning and image processing). Design software for machine-assisted translation of graphical user interfaces and on-line help from English to Japanese.
- 1990 Intern, Kodak R&D Japan, Software Development Dept., Yokohama, Japan.  
Develop Japanese localized version of image database software for VAX VMS.
- 1988-1989 Intern, IBM, I/O Subsystems Dept., Rochester, MN and Fujisawa, Japan.  
Develop embedded SCSI device drivers for peripheral CD-ROM and magneto-optical devices for AS400 computers.

## Teaching

- 2013-present “Medical Physics Imaging Course,” Harvard Medical School Residency Program, Boston, MA.  
Course director for post-graduate seminar course to teach Medical Physics residents about medical imaging physics for radiotherapy.
- 2012-present “PHYS 4651 – Medical Physics Seminar 1,” Northeastern University, Boston, MA.  
Course co-director for senior level seminar course, 1 semester, 6-8 students per semester, 20 hours in-class.
- 2012-present “2-D simulation,” “Image-guided radiation therapy,” “Image fusion,” “Mathematical methods for medical imaging,” “State regulation,” “Cavity theory.” Harvard Medical School Residency Program, Boston, MA.  
Lecturer for post-graduate training of medical physics residents.
- 2014-present “CT,” “PET/CT,” and “IGRT,” Harvard Medical School Residency Program, Boston, MA.  
Lecturer for post-graduate training of radiation oncology medical residents.
- 2013-present “HST.S14 – Optimization problems in radiation therapy and medical imaging,” MIT, Cambridge, MA.  
Course co-director for graduate level course, 10 students per semester, 8 hours in-class per semester.
- 2009-2013 “MS-L315 – Radiation Physics Laboratory,” Suffolk University, Boston, MA.  
Sophomore level lab course, 4 semesters, 8-21 students per semester, 20 hours in-class per semester.
- 2010-2011 “C++ programming,” Massachusetts General Hospital, Boston, MA.  
Senior level course, 1 semester, 15 students, 20 hours in-class teaching.
- 2007 “CSG144 – Pattern Recognition and Computer Vision,” Northeastern University, Dept. of Computer and Information Sciences, Boston, MA.  
Graduate level course, 1 semester, 15 students, 40 hours in-class teaching.
- 2006 “CSG142 – Digital Image Processing,” Northeastern University, Dept. of Computer and Information Sciences, Boston, MA.  
Graduate level course, 1 semester, 8 students, 40 hours in-class in-class teaching.
- 1997 “CSE 402 – Introduction to Operating Systems,” University of Michigan, Dept. of Electrical Engineering and Computer Science, Ann Arbor, MI.  
Senior level class: 1 semester, 40 students, 25 hours in-class teaching.
- 1995-1996 “CS 302 – Introduction to Programming,” University of Wisconsin, Dept. of Computer Sciences, Madison, WI.  
Freshman level class: 3 semesters, 110 students, 180 hours in-class teaching.

**Mentoring**

- 2017-present PhD research advisor, Keyur Shah, Drexel University.
- 2017-present PhD research advisor, Shihao Song, Drexel University.
- 2017-present PhD research advisor, Seyedali Mirzapourrezaei, Wichita State University.
- 2016 Postdoctoral advisor, Matteo Seregini, Politecnico di Milano.
- 2015-2016 Undergraduate research advisor, Xuhua Ren, Tianjin University.
- 2014- PhD thesis committee, Pingge Jiang, Drexel University.
- 2012- PhD thesis committee, Rajath Soans, Drexel University.
- 2009-2017 PhD thesis advisor, Gueorge Gueorguiev, University of Massachusetts, Lowell.
- 2012-2015 Postdoctoral advisor, Justin Phillips, MGH.
- 2012-2015 PhD research advisor, Maxime Desplanque, Politecnico di Milano.
- 2014-2015 Undergraduate research advisor, Inna Gerstenshteyn, Boston University.
- 2014 Masters thesis advisor, Robert Hommes, Eindhoven University of Technology.
- 2013-2014 Masters thesis advisor, Joris Radermacher, Eindhoven University of Technology.
- 2012-2014 Postdoctoral advisor, Yang-Kyun Park, MGH.
- 2010-2014 Postdoctoral advisor, Nadya Shusharina, MGH.
- 2013 Masters research advisor, Dolla Toomeh, University of Massachusetts, Lowell.
- 2012-2013 PhD research advisor, Mengjiao Wang, Tsinghua University.
- 2012 Undergraduate research advisor, Andre Miguel Monteiro, Lisbon University.
- 2012 Undergraduate research advisor, Willem Rohl-Hill, University of Buffalo.
- 2011-2012 Postdoctoral advisor, James Shackelford, MGH.
- 2011-2012 Resident research advisor, Kent Riley, MGH.
- 2011-2012 Masters research advisor, Amelia Arbisser, MIT.
- 2011 Undergraduate research advisor, Ana Monica Lourenco, Lisbon University.
- 2011 Masters thesis advisor, Qi Yang, University of Heidelberg.
- 2010-2011 Research advisor, Esra Cansizoglu, Northeastern University.
- 2009-2011 Masters thesis advisor, Robert Schneider, University of Massachusetts, Lowell.
- 2009-2011 Postdoctoral advisor, Rui Li, MGH.
- 2008-2011 PhD research advisor, Sila Kurugol, Northeastern University.
- 2008-2011 PhD research advisor, James Shackelford, Drexel University.
- 2009 Undergraduate research advisor, Edward Kim, MGH.

**Mentoring (cont.)**

- 2008 Masters thesis advisor, Patrick Hoyer, University of Heidelberg.
- 2008 PhD qualifying examiner, Northeastern University.
- 2008 Masters thesis committee, Burak Eram, Northeastern University.
- 2008 PhD thesis committee, Ying Cui, Northeastern University.
- 2006-2007 Postdoctoral advisor, Ziji Wu, Massachusetts General Hospital.
- 2005 PhD thesis committee, Vlad Boldea, Universite Lumiere Lyon 2.
- 2003 Masters thesis committee, Jason Ruel, Boston University.

## Consulting

- 2013      Consultant, Northwestern University, Evanston, Illinois.  
Develop a CMake cross-platform build configuration system for the AIM library.
- 2002      Consultant, University of Michigan, Ann Arbor, Michigan.  
Develop a computer vision calibration, tracking and measurement system for performance evaluation of a hexapod robot. Develop segmentation-based and correlation-based pattern matching methods. Develop and tune multiple-hypothesis Kalman filter tracking methods.  
This software is available for free on the web at <http://gtms.sourceforge.net>.
- 2002      Consultant, University of Michigan, Ann Arbor, Michigan.  
Develop a computer vision calibration, tracking and measurement system for high-speed kinematic estimation of a running cockroach. Develop direction-dependant sub-pixel corner finding methods.
- 1999      Consultant, University of Michigan, Ann Arbor, Michigan.  
Develop another computer vision calibration, tracking and measurement system for performance evaluation of a hexapod robot.
- 1998      Consultant, Selectware, Livonia, Michigan.  
Develop computer vision calibration, tracking and curve fitting algorithms for real-time position estimation and visualization of a thrown bowling ball.
- 1997      Consultant, Goknar Behavioral Maps, Oak Park, Michigan.  
Develop expert system software for computer assisted psychiatric diagnosis and treatment.

**Professional Service**

- 2018 Immediate Past President, NEAAPM.
- 2017 President, NEAAPM.
- 2017 Workshop organizer: Auto-Segmentation for Thoracic Radiation Treatment Planning, Denver, CO.
- 2016 President Elect, NEAAPM. Organized four meetings for local AAPM chapter.
- 2015 Workshop organizer: Head and Neck Segmentation Challenge, Munich, Germany.
- 2015 Workshop organizer: Autoseg 2015, Toronto, ON.
- 2013- Member: AAPM Therapy Imaging Subcommittee.
- 2007-present Session chair: AAPM annual meeting.
- 2014-2015 Secretary: New England AAPM chapter.
- 2011-2014 Workshop organizer: 3D-Slicer user group, at AAPM annual meeting.
- 2014 Workshop organizer: MICCAI IGART workshop, Boston, MA.
- 2013 Workshop organizer: Autoseg 2013, Boston, MA.
- 2012-2014 Member: ITIC, National registry of radiation oncology.
- 2012-2014 Corresponding member: ICRP Task Group 88: Radiological protection in cone-beam CT.
- 2007 Seminar series organizer: MGH physics research lecture series, Boston, MA.
- 2005 Member: Ad hoc Study Group on Safety Requirements Relating to Installation, Configuration and Maintenance of Networkable Medical Devices, Food and Drug Administration, Washington DC.
- 2005 Member: Working Group on Foundations of Integration, High Confidence Medical Devices System and Software, NCO/ITRD/NSF, Philadelphia PA.
- 2001-2002 President: Computer Science and Engineering Graduate student organization, University of Michigan.
- 2000-2001 Vice-President: Computer Science and Engineering Graduate student organization, University of Michigan.

**Awards**

- 2016-2019 Principle Investigator, NSF, “Collaborative Research: Optimization Methods for Real-time Organ-motion Management in Radiotherapy,” (Sharp, PI)
- 2016-2019 Principle Investigator, NSF, “Collaborative Research: SI2-SSE: High-Performance Work flow Primitives for Image Registration and Segmentation,” (Sharp, PI)
- 2014-2017 Investigator, Elekta Research Grant, “Motion management with online imaging,” (Winey, PI)
- 2011-2014 Investigator, NIH-2-R01-CA111590-05A1, “Four-dimensional Monte Carlo dose calculation,” (Paganetti, PI)
- 2013-2014 Principle Investigator, Ira J. Spiro translational research award, “The development of a biologically-guided target definition for localized and locally advanced non-small cell lung cancer,” (Sharp, PI)
- 2012-2014 Principle Investigator, NIH/MGH Federal Share Grant, “An open-source software for proton treatment planning,” (Sharp, PI)
- 2011-2013 Principle Investigator, NIH/MGH Federal Share Grant, “Reducing uncertainties in SBRT for Pancreatic Cancer,” (Sharp, PI)
- 2011-2014 Investigator, NIH-2-R01-CA111590-05A1, “Four-dimensional Monte Carlo dose calculation,” (Paganetti, PI)
- 2010-2014 Site PI, NIH-U54 2-U54-EB005149-06, National Alliance for Medical Image Computing, (Kikinis, PI)
- 2010-2011 Principle Investigator, Ira J. Spiro translational research award, “Adaptive radiotherapy for head and neck cancer,” (Sharp, PI)
- 2008-2010 Principle Investigator, NIH/MGH Federal Share Grant, “GPU-Accelerated Proton Dose Calculation,” (Sharp, PI)
- 2007-2012 Investigator, NIH-P01 CA021239-29A1, “Proton Therapy Radiation Research,” (DeLaney, PI)
- 2007-2012 Investigator, NIH-R01 CA118200-01A2, “Management of Breathing Effects in Radiotherapy Planning,” (Bortfeld, PI)
- 2005-2007 Investigator, NIH-R21 CA110177-01, “A Tumor Tracking System for Image Guided Radiotherapy,” (Jiang, PI)
- 2001 NSF Summer Institute in Korea, Sogang University, Seoul Korea. Research in facial animation for computer graphics.
- 1985-1991 Japanese Engineering Leadership Scholarship



## **Honors**

- 2017 Editors Choice, Medical Physics.
- 2015 Editors Pick, Medical Physics. (cover article!)
- 2014 Editors Pick, Medical Physics.
- 2013 Featured article, Physics in Medicine and Biology (twice!).
- 2008 Physics in Medicine and Biology Citation Award (7th most cited paper '03-'08)
- 2001 Rackham Scholar Nominee
- 1996 University of Wisconsin Outstanding Teaching Assistant Nominee
- 1991 Graduation with Distinction
- 1990 Certificate in Japanese Studies for Engineers
- 1985-1991 Dean's Honor List

## **Professional Affiliations**

- 1997-present Member, Association for Computing Machinery.
- 2005-present Member, American Association of Physicists in Medicine.
- 1997-2014 Member, IEEE and IEEE Computer Society.

## **Community Service**

- 2017-present Open Space and Recreation Committee, City of Beverly, MA.
- 2005-2013 Mentor: Just ASK Mentorship program, University of Michigan Department of Engineering.
- 2000 Mentor: Michigan Mentoring Program for gifted high school children.
- 1999 Mentor: University of Michigan Tutoring Services program for gifted middle school children.

## **Language Proficiency**

English (native) and Japanese (intermediate).

### **Peer Review (Current)**

British Journal of Radiology  
Computer Methods and Programs in Biomedicine  
International Journal of Radiation Oncology, Biology, Physics  
Medical Image Analysis  
Medical Physics (also Associate Editor)  
Physica Medica  
Physics in Medicine and Biology  
Radiological Physics and Technology  
Radiotherapy and Oncology

AAPM (American Association of Physicists in Medicine)  
ASTRO (American Society for Radiation Oncology)  
BIOIMAGING (Joint Conference on Biomedical Engineering Systems and Technologies)  
ISBI (IEEE International Symposium on Biomedical Imaging)  
World Congress on Medical Physics

### **Peer Review (Historic)**

ACM Transactions on Graphics  
BMC Medical Informatics and Decision Making  
Computer Vision Image Understanding  
IEEE Transactions on Image Processing  
IEEE Transactions on Pattern Analysis and Machine Intelligence  
IEEE Transactions on System, Man and Cybernetics  
IEEE Transactions on Multimedia  
IEEE Transactions on Information Technology in Biomedicine  
Journal of Applied Clinical Medical Physics  
Journal of Radiation Research  
Machine Vision and Applications  
Nuclear Instruments and Methods in Physics Research Section A  
Pattern Recognition  
Pattern Recognition Letters

CVPR (IEEE Conference of Computer Vision and Pattern Recognition)  
ICCR (International Conference on the Use of Computers in Radiotherapy)  
ICECS (IEEE Circuits and Systems)  
ICRA (IEEE International Conference of Robotics and Automation)  
MICCAI (Medical Image Computing and Computer Assisted Intervention)

**Peer Reviewed Journal Articles**

Yang J, Veeraraghavan H, Armato SG, Farahani K, Kirby JS, Kalpathy-Kramer J, van Elmpt W, Dekker A, Han X, Feng X, Aljabar P, Oliveira B, van der Heyden B, Zamdborg L, Lam D, Gooding M, Sharp GC. "Autosegmentation for thoracic radiation treatment planning: A grand challenge at AAPM 2017" *Med Phys*. 2018 Aug 24. doi: 10.1002/mp.13141. **Editors Choice**.

Moteabbed M, Trofimov A, Khan FH, Wang Y, Sharp GC, Zietman AL, Efstathiou JA, Lu HM. "Impact of interfractional motion on hypofractionated pencil beam scanning proton therapy and VMAT delivery for prostate cancer." *Med Phys*. 2018 Jul 14. doi: 10.1002/mp.13091.

Pileggi G, Speier C, Sharp GC, Izquierdo Garcia D, Catana C, Pursley J, Amato F, Seco J, Spadea MF. "Proton range shift analysis on brain pseudo-CT generated from T1 and T2 MR." *Acta Oncol*. 2018 May 29;1-11. doi: 10.1080/0284186X.2018.1477257.

Zaffino P, Ciardo D, Raudaschl P, Fritscher K, Ricotti R, Alterio D, Marvaso G, Fodor C, Baroni G, Amato F, Orecchia R, Jereczek-Fossa BA, Sharp GC, Spadea MF. "Multi atlas based segmentation: should we prefer the best atlas group over the group of best atlases?" *Phys Med Biol*. 2018 Jun 19;63(12):12NT01. doi: 10.1088/1361-6560/aac712.

Baer E, Lalonde A, Zhang R, Jee KW, Yang K, Sharp GC, Liu B, Royle G, Bouchard H, Lu HM. "Experimental validation of two dual-energy CT methods for proton therapy using heterogeneous tissue samples. *Med Phys*, Jan 2018. <https://doi.org/10.1002/mp.12666>.

Zhang R, Jee KW, Cascio E, Sharp GC, Flanz JB, Lu HM. "Improvement of single detector proton radiography by incorporating intensity of time-resolved dose rate functions." *Phys Med Biol*. 2017 Dec 29;63(1):015030. doi: 10.1088/1361-6560/aa9913.

Zhang R, Baer E, Jee KW, Sharp GC, Flanz J, Lu HM. "Investigation of real tissue water equivalent path lengths using an efficient dose extinction method." *Phys Med Biol*. 2017 Jun 23;62(14):5640-5651. doi: 10.1088/1361-6560/aa782c.

Raudaschl PF, Zaffino P, Sharp GC, et al. "Evaluation of segmentation methods on head and neck CT: Auto-segmentation challenge 2015." *Med Phys*. 2017 May;44(5):2020-2036. doi: 10.1002/mp.12197. Epub 2017 Apr 21. **Editors Choice**.

Moteabbed M, Trofimov A, Sharp GC, Wang Y, Zietman AL, Efstathiou JA, Lu HM. "Proton therapy of prostate cancer by anterior-oblique beams: implications of setup and anatomy variations." *Phys Med Biol*. 2017 Mar 7;62(5):1644-1660. doi: 10.1088/1361-6560/62/5/1644. Epub 2017 Feb 6. PMID: 28166057.

**Peer Reviewed Journal Articles (cont.)**

Wachinger C, Brennan M, Sharp G, Golland P. Efficient Descriptor-Based Segmentation of Parotid Glands with Non-Local Means. *IEEE Trans Biomed Eng.* 2016 Sep 16. doi: 10.1109/TBME.2016.2603119. [Epub ahead of print] PMID: 28113224.

Jee KW, Zhang R, Bentefour EH, Doolan PJ, Cascio E, Sharp G, Flanz J, Lu HM. Investigation of time-resolved proton radiography using x-ray flat-panel imaging system. *Phys Med Biol.* 2017 Mar 7;62(5):1905-1919. doi: 10.1088/1361-6560/aa5a43. Epub 2017 Jan 18. PMID: 28099164.

Kim J, Park YK, Sharp G, Busse P, Winey B. “Water equivalent path length calculations using scatter-corrected head and neck CBCT images to evaluate patients for adaptive proton therapy.” *Phys Med Biol.* 2017 Jan 7;62(1):59-72. Epub 2016 Dec 14. PMID: 27973351.

Kurz C, Kamp F, Park YK, Zöllner C, Rit S, Hansen D, Podesta M, Sharp GC, Li M, Reiner M, Hofmaier J, Nepl S, Thieke C, Nijhuis R, Ganswindt U, Belka C, Winey BA, Parodi K, Landry G. “Investigating deformable image registration and scatter correction for CBCT-based dose calculation in adaptive IMPT.” *Med Phys.* 2016 Oct;43(10):5635. PMID: 27782706

Saleh Z, Thor M, Apte AP, Sharp G, Tang X, Veeraraghavan H, Muren L, Deasy J. A multiple-image-based method to evaluate the performance of deformable image registration in the pelvis. *Phys Med Biol.* 2016 Aug 21;61(16):6172-80. doi: 10.1088/0031-9155/61/16/6172. Epub 2016 Jul 29. PMID: 27469495.

He B, Huang C, Sharp G, Zhou S, Hu Q, Fang C, Fan Y, Jia F. Fast automatic 3D liver segmentation based on a three-level AdaBoost-guided active shape model. *Med Phys.* 2016 May;43(5):2421. Doi: 10.1118/1.4946817. PMID: 27147353

Bian J, Sharp GC, Park YK, Ouyang J, Bortfeld T, El Fakhri G. “Investigation of cone-beam CT image quality trade-off for image-guided radiation therapy.” *Phys Med Biol.* 2016 May 7;61(9):3317-46. doi: 10.1088/0031-9155/61/9/3317. Epub 2016 Apr 1.

Moteabbed M, Trofimov A, Sharp GC, Wang Y, Zietman AL, Efstathiou JA, Lu HM. “A Prospective Comparison of the Effects of Interfractional Variations on Proton Therapy and Intensity Modulated Radiation Therapy for Prostate Cancer.” *Int J Radiat Oncol Biol Phys.* 2016 May 1;95(1):444-53. doi: 10.1016/j.ijrobp.2015.12.366. Epub 2015 Dec 29.

**Peer Reviewed Journal Articles (cont.)**

Kolesov I, Lee J, Sharp G, Vela P, Tannenbaum A. "A Stochastic Approach to Diffeomorphic Point Set Registration with Landmark Constraints. *IEEE Trans Pattern Anal Mach Intell.* 2016 Feb;38(2):238-51. doi: 10.1109/TPAMI.2015.2448102. PMID: 26761731

Gueorguiev G, Cotter C, Turcotte JC, Crawford B, Sharp G, Mah'D M. "Clinical implementation and error sensitivity of a 3D quality assurance protocol for prostate and thoracic IMRT." *J Appl Clin Med Phys.* 2015 Sep 8;16(5):5392. PMID: 26699299

Park YK, Sharp GC, Phillips J, Winey BA. "Proton dose calculation on scatter-corrected CBCT image: Feasibility study for adaptive proton therapy." *Med Phys.* 2015 Aug;42(8):4449. **Cover Article.**

Dowdell S, Grassberger C, Sharp G, Paganetti H. Fractionated Lung IMPT Treatments: Sensitivity to Setup Uncertainties and Motion Effects Based on Single-Field Homogeneity. *Technol Cancer Res Treat.* 2016 Oct;15(5):689-96. doi: 10.1177/1533034615595761. Epub 2015 Jul 24. PMID: 26208837

Rehani MM, Gupta R, Bartling S, Sharp GC, Pauwels R, Berris T, Boone JM. "Radiological Protection in Cone Beam Computed Tomography (CBCT). ICRP Publication 129.", *Ann ICRP.* 2015 Jul;44(1):9-127.

Hani Al-Halabi, Peter Paetzold, Gregory C. Sharp, Christine Olsen, Henning Willers. A Contralateral Esophagus-Sparing Technique to Limit Severe Esophagitis Associated With Concurrent High-Dose Radiation and Chemotherapy in Patients With Thoracic Malignancies. *Int J Radiat Oncol Biol Phys.*, Volume 92, Issue 4, 15 July 2015, Pages 803–810.

Wachinger C, Fritscher K, Sharp G, Golland P. "Countour-Driven Atlas-Based Segmentation." *IEEE Trans Med Imaging.* 2015 Dec;34(12):2492-505.

Grassberger C, Dowdell S, Sharp G, Paganetti H. "Motion mitigation for lung cancer patients treated with active scanning proton therapy." *Med Phys.* 2015 May;42(5):2462-9.

Park YK, Sharp GC. Gain Correction for an X-ray Imaging System With a Movable Flat Panel Detector and Intrinsic Localization Crosshair. *Technol Cancer Res Treat.* 2016 Apr;15(2):387-95. doi: 10.1177/1533034615576829. Epub 2015 Mar 20. PMID: 25795048

Doolan PJ, Testa M, Sharp G, Bentefour EH, Royle G, Lu HM. "Patient-specific stopping power calibration for proton therapy planning based on single-detector proton radiography," *Phys Med Biol.* 2015 Mar 7;60(5):1901-17.

**Peer Reviewed Journal Articles (cont.)**

Moteabbed M, Sharp GC, Wang Y, Trofimov A, Efstathiou JA, Lu HM. "Validation of a deformable image registration technique for cone beam CT-based dose verification," *Med Phys*. 2015 Jan;42(1):196-205.

Shusharina N, Sharp GC, Choi NC. "Correlation of 18F-FDG PET avid volumes on pre-radiation therapy and post-radiation therapy FDG PET scans in recurrent lung cancer. In reply to Saraiya et al," *Int J Radiat Oncol Biol Phys*. 2014 Nov 15;90(4):969-70.

Phillips J, Gueorguiev G, Shackelford JA, Grassberger C, Dowdell S, Paganetti H, Sharp GC. "Computing proton dose to irregularly moving targets," *Phys Med Biol*. 2014 Aug 7;59(15):4261-73.

Grassberger C, Daartz J, Dowdell S, Ruggieri T, Sharp G, Paganetti H. "Quantification of proton dose calculation accuracy in the lung." *Int J Radiat Oncol Biol Phys*. 2014 Jun 1;89(2):424-30.

Fritscher KD, Peroni M, Zaffino P, Spadea MF, Schubert R, Sharp G. "Automatic segmentation of head and neck CT images for radiotherapy treatment planning using multiple atlases, statistical appearance models, and geodesic active contours," *Med Phys*. 2014 May;41(5):051910. **Editor's Pick.**

Sharp G, Fritscher KD, Pekar V, Peroni M, Shusharina N, Veeraraghavan H, Yang J. "Vision 20/20: perspectives on automated image segmentation for radiotherapy." *Med Phys*. 2014 May;41(5):050902.

Wang M, Sharp GC, Rit S, Delmon V, Wang G. "2D/4D marker-free tumor tracking using 4D CBCT as the reference image." *Phys Med Biol*. 2014 May 7;59(9):2219-33.

Shusharina N, Cho J, Sharp GC, Choi NC. "Correlation of (18)F-FDG avid volumes on pre-radiation therapy and post-radiation therapy FDG PET scans in recurrent lung cancer." *Int J Radiat Oncol Biol Phys*. 2014 May 1;89(1):137-44.

Saleh ZH, Apte AP, Sharp GC, Shusharina NP, Wang Y, Veeraraghavan H, Thor M, Muren LP, Rao SS, Lee NY, Deasy JO. "The distance discordance metric-a novel approach to quantifying spatial uncertainties in intra- and inter-patient deformable image registration," *Phys Med Biol*. 2014 Feb 7;59(3):733-46.

Peroni M, Golland P, Sharp GC, Baroni G, "Stopping Criteria for Log-Domain Diffeomorphic Demons Registration: An Experimental Survey for Radiotherapy Application," *Technol Cancer Res Treat*, 2013, Aug 31.

**Peer Reviewed Journal Articles (cont.)**

Wang Y, Efstathiou JA, Lu HM, Sharp GC, Trofimov A, Hypofractionated proton therapy for prostate cancer: dose delivery uncertainty due to interfractional motion,” *Medical physics*, 2013 Jul;40(7):071714.

Dowdell S, Grassberger C, Sharp GC, Paganetti H. “Interplay effects in proton scanning for lung: A 4D Monte Carlo study assessing the impact of tumor and beam delivery parameters,” *Physics in Medicine and Biology*, 2013 Jun 21;58(12):4137-56.

Peroni, M., Spadea, M.F., Riboldi, M., Falcone, S., Vaccaro, C., Sharp, G.C., Baroni, G. “Validation of Automatic Contour Propagation for 4D Treatment Planning using Multiple Metrics,” *Technol Cancer Res Treat*, Vol 12 , pp 501-510, Jun 2013.

Jason Efstathiou, et al., “Practice-based evidence to evidence-based practice: building the National Radiation Oncology Registry,” *J Oncol Pract*, 2013 May;9(3):e90-5.

Esra Ataer-Cansizoglu, Erhan Bas, Jayashree Kalpathy-Cramer, Gregory C. Sharp, Deniz Erdogmus, “Contour-based shape representation using principal curves,” *Pattern Recognition*, Volume 46, Issue 4, April 2013, Pages 1140-1150.

Li R, Sharp G. “Robust fluoroscopic tracking of fiducial markers: exploiting the spatial constraints,” *Physics in medicine and biology*, 2013 Mar 21;58(6):1789-808.

Grassberger C, Dowdell S, Lomax A, Sharp G, Shackelford J, Choi N, Willers H, Paganetti H., Motion interplay as a function of patient parameters and spot size in spot scanning proton therapy for lung cancer, *Int J Radiat Oncol Biol Phys*. 2013 Jun 1;86(2):380-6.

Chiara Paganelli, Marta Peroni, Marco Riboldi, Gregory C Sharp, Delia Ciardo, Daniela Alterio, Roberto Orecchia and Guido Baroni, “Scale invariant feature transform in adaptive radiation therapy: a tool for deformable image registration assessment and re-planning indication,” *Physics in Medicine and Biology*, 2013 Jan 21;58(2):287-99.

Nadezhda Shusharina, Gregory C Sharp, “Image registration using radial basis functions with adaptive radius,” *Medical Physics*, Vol 39, No 11, pp 6542-9, Nov 2012.

Ben M Clasié, Gregory C Sharp, Joao Seco, Jacob B Flanz, Hanne M Kooy, “Numerical solutions of the gamma index in two and three dimensions,” *Physics in Medicine and Biology*, Vol 57, No 21, pp 6981-97, Nov 7, 2012.

**Peer Reviewed Journal Articles (cont.)**

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**Abstracts and Posters (cont.)**

SB Jiang, T Bortfeld, A Trofimov, E Rietzel, G Sharp, N Choi, GTY Chen, “Synchronized Moving Aperture Radiation Therapy (SMART): Plan Optimization and MLC Leaf Sequencing Based on 4D CT Data,” AAPM 45, San Diego, August 2003.

Da Young Ju, Jin-Ho Yoo, Kyoung Chin Seo, Gregory Sharp, Sang Wook Lee, “Image-Based Illumination for Electronic Display of Artistic Paintings,” SIGGRAPH Technical Sketch, San Antonio, July 2002.



## **Books**

James Shackelford, Nagarajan Kandasamy, Gregory C. Sharp, "High-Performance Deformable Image Registration Algorithms for Manycore Processors," Morgan Kaufmann, 2013.

## **Book Chapters**

Gregory C. Sharp, Rui Li, Nagarajan Kandasamy, "Theoretical Aspects of Target Detection and Tracking," and "Fault Detection in Image-Based Tracking," in *Adaptive Motion Compensation in Radiotherapy* (1st Edition), M.J. Murphy ed., CRC Press, 2012.

James Shackelford, Nagarajan Kandasamy, Gregory C. Sharp, "Deformable Volumetric Registration using B-splines," in *GPU Computing Gems Emerald Edition* (1st Edition), W. Hwu ed., Morgan Kaufmann, 2011.

George T.Y. Chen, Gregory C. Sharp, John A. Wolfgang, "Imaging in Radiotherapy," in *Treatment Planning in Radiation Oncology* (3rd Edition), F. Khan and B. Gerbi eds., Lippincott Williams & Wilkins, 2011.

Nagarajan Kandasamy, Sherif Abdelwahed, Gregory C. Sharp, John P. Hayes, "An Online Control Framework for Designing Self-Optimizing Computing Systems: Application to Power Management," in *Self-star Properties in Complex Information Systems: Conceptual and Practical Foundations* (1st Edition), O. Babaoglu, M. Jelasity, A. Montresor, C. Fetzer, and S. Leonardi eds., Springer 2005.

## **Invited Publications**

George T. Chen, Gregory C. Sharp, Shinichiro Mori, "A Review of Image Guided Radiotherapy," *Radiological Physics and Technology*, Vol 2, No 1, pp 1-12, January 2009.

Gregory C. Sharp, Hsiao Ming Lu, Alexei Trofimov, Xiaoli Tang, Steve B. Jiang, Julie Turcotte, David P. Gierga, George T.Y. Chen, Theodore S. Hong, "Assessing Residual Motion for Gated Proton-Beam Radiotherapy," *Journal of Radiation Research*, Vol 48, Supplement A, pp 55-59, 2007.

Mohit Dilip Khandekar, Nagarajan Kandasamy, Sherif Abdelwahed, Gregory C. Sharp, "An Online Predictive Control Framework for Designing Self-Managing Computing Systems," *Multiagent and Grid Systems*, Vol 1, No 2, 2005, pp 63-72.

### **Other Publications**

Da Young Ju, Jin-Ho Yoo, Gregory C. Sharp, Sang Wook Lee, "Image-Based Illumination for Electronic Display of Artistic Paintings," University of Michigan Tech Report CSE-TR-466-02, September 2002.

Gregory C. Sharp, Sang W. Lee, David K. Wehe, "Registration of Range Images in the Presence of Occlusions and Missing Data," University of Michigan Technical Report CSE-TR-453-02, Feb 2002.

Gregory C. Sharp, Sang W. Lee, David K. Wehe, "ICP Registration using Invariant Features," University of Michigan Technical Report CSE-TR-435-00, Sept 2000.

Gregory C. Sharp, Sang W. Lee, David K. Wehe, "An Apparatus and Method for the Complete Construction of Three Dimensional Models," Patent Disclosure to the University of Michigan Technology Transfer Office, September 2000.

### **Invited Presentations**

“3D Slicer for Medical Physics Research and Development,” and “3D Slicer for Medical Image Processing,” Brazilian Congress of Medical Physics, Ribeirao Preto, Brazil. September 2017.

“Overview of Current Status of Auto-Segmentation in Radiation Oncology,” AAPM 2017, Denver CO.

“Multi-modal Image Registration,” Image-Guided and Robotic Radiotherapy Workshop, Mannheim, Germany, August 2016.

“Image Registration and Segmentation,” Ludwig-Maximilians University, Munich, Germany, August 2016.

“Image Registration and Segmentation,” RAMPS Annual Meeting, New York, NY, June 2016.

“Multi-modal Image Registration,” and “3D Slicer for Radiotherapy Research,” Danish Society of Medical Physics Annual Meeting, Nyborg, Denmark, April 2016.

“Automatic Segmentation of Images and Assessing Reliability,” ASTRO 2015, San Antonio, TX, October 2015.

“Plastimatch and SlicerRT,” AAPM 2015, Anaheim, CA, July 2015.

“Automated segmentation of images for treatment planning purposes,” World Congress on Medical Physics and Biomedical Engineering, Toronto, ON, June 2015.

“Perspectives on Automatic Image Segmentation for Radiotherapy,” MICCAI IGART Workshop, Boston, MA, October, 2014.

“Open source software for medical physics research,” Brigham and Women's Hospital, Boston, MA, November, 2013.

“Perspectives on Automatic Image Segmentation for Radiotherapy,” NEAAPM Fall Meeting, Waltham, MA, October, 2013.

“Image-guided Radiation Therapy,” Suffolk University, Boston, MA, September, 2013.

“3D Slicer for Medical Physics Research,” PLUNC User group meeting at AAPM/COMP, Vancouver, BC, August, 2011.

“B-spline and landmark-based deformable image registration,” Memorial Sloan-Kettering Cancer Center, New York, NY, July, 2011.

“Deformable image registration using B-splines,” NEAAPM Winter Meeting, Dedham, MA, February 2011.

**Invited Presentations (cont.)**

“Image-guided Radiation Therapy,” Harvard Medical School Radiation Oncology Residency Program, MGH, Boston, MA, October 2010.

“Practical CT,” Medical Imaging, University of Massachusetts Boston, Boston, MA, September, 2010.

“An introduction to GPU computing,” AAPM Annual Meeting, Philadelphia, PA, July 2010.

“Deformable image registration for radiotherapy,” Workshop: GPU Computing for Biomedical Research, Boston, MA, October 2009.

“Image-guided Radiation Therapy,” Harvard Medical School Radiation Oncology Residency Program, MGH, Boston, MA, October 2009.

“GPU-accelerated conebeam reconstruction,” Politecnico di Milano, Milano Italy, January 2009.

“Plastimatch,” Varian iLabs Workshop, Baden Switzerland, January 2009.

“Image-guided Radiation Therapy,” Harvard Medical School Radiation Oncology Residency Program, MGH, Boston, MA, October 2008.

“Deformable image registration,” Medical physics course for undergraduates, Northeastern University Medical Physics Seminar, Boston, MA, October, 2008.

“Image-guided radiation therapy,” Medical physics course for undergraduates, Northeastern University Medical Physics Seminar, Boston, MA, October, 2008.

“Respiratory Gated Radiation Therapy,” Memorial Sloan-Kettering Cancer Center, New York NY, July 2008.

“4D Targeting Error Analysis in Image-Guided Radiotherapy,” Varian Research Partners Workshop, Austin TX, April 2008.

“Image Guidance and Respiratory Gating in Radiation Therapy,” General Electric Global Research, Schenectady NY, April 2008.

“Marker-based and Markerless Fluoroscopic Image Guidance,” Varian iLabs Workshop, Baden Switzerland, February 2008.

“Image Guided Radiotherapy,” Mitsubishi Electric Research Laboratory, Cambridge, MA, December 2007.

**Invited Presentations (cont.)**

“IGRT and Respiratory Gating,” Educational Series for Radiation Therapy Technicians, MGH, Boston, MA, October, 2007.

“Image guided radiotherapy,” Harvard-MIT Division of Health Sciences and Technology, Boston, MA, October, 2007.

“Fluoroscopic Image Guidance,” Real-Time Motion Adaptive Radiation Therapy Workshop, Georgetown University, May 2007.

“Image Guidance for Gated Radiotherapy,” NIRS-CNAO Joint Symposium on Carbon Ion Therapy, Milan, Italy, November 2006.

“Deformable Registration of Lung CT,” Medical Physics Seminar, Brigham and Woman’s Hospital, November 2005.

“Image-guided Radiation Therapy,” Computer Sciences Colloquium, Drexel University, April 2005.

“Multimodality and Deformable Registration: Challenges in Radiation Oncology,” CENSSIS Research and Industrial Collaboration Conference, Northeastern University, October 2004.

“An Automatic Method of Anatomical Landmark Localization for Daily Patient Positioning,” NEAAPM Young Investigator Symposium, May 2004.

“Research in Image-guided Radiotherapy at MGH,” Tohoku University, July 2003.

“Tracking Radio-Opaque Markers in Fluoroscopic Video,” NEAAPM Young Investigator Symposium, April 2003.

“Modeling and Predicting Human Breathing,” Massachusetts General Hospital Image Guidance Workshop, Jan 2003.

“Automatic and Stable Multiview 3D Surface Registration,” MIT Graphics Seminar, April 2002.

“Toward Multiview Registration in Frame Space,” Sogang University Electrical Engineering Seminar, July 2001.

“Toward Multiview Registration in Frame Space,” KAIST Graphics Seminar, July 2001.

“Toward Multiview Registration in Frame Space,” Seoul National University Graphics Seminar, July 2001.