

## CURRICULUM VITAE

R. ALFREDO C. SIOCHI, PH.D.

October 6, 2010

### **I. EDUCATIONAL AND PROFESSIONAL HISTORY**

#### **A. List of institutions attended, board certification, licensure**

6/1981-3/1985	B. S. Ateneo de Manila University – Physics, Summa Cum Laude Quezon City Philippines
9/1985-2/1988	M.S., Physics, Virginia Tech Blacksburg VA
9/1985-12/1990	Ph.D., Physics Virginia Tech Blacksburg VA
8/1993-3/1995	M.S., Radiological Physics, University of Cincinnati Cincinnati OH

#### **Board certification**

2005	American Board of Radiology in Radiological Physics
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#### **B. Professional and Academic Positions**

4/1985-6/1985	Instructor, Physics Department, Ateneo de Manila University Quezon City, Philippines
9/1985-12/1990	Graduate Assistant, Physics Department Virginia Tech University Blacksburg VA
1/1991-5/1991	Visiting Assistant Professor, Physics Department Virginia Tech University Blacksburg VA
9/1991-5/1993	Visiting Assistant Professor, Physics Department Muskingum College New Concord OH
1/1994-3/1995	Graduate Student Assistant, University of Cincinnati Barrett Cancer Center Cincinnati OH
5/1995-8/2002	Medical Physicist, Siemens Medical Systems Oncology Care Systems Concord CA
8/2002-12/2004	Assistant Member, St. Jude Children's Research Hospital Memphis TN
1/2005-current	Assistant Professor, Department of Radiation Oncology, University of Iowa, Iowa City IA
9/2007-current	secondary appointment in the Department of Electrical and Computer Engineering, University of Iowa, Iowa City, IA
11/2007-current	Director, Medical Physics Education in the Department of Radiation Oncology, University of Iowa, Iowa City, IA

11/2007-current	Deputy Director, Medical Physics Residency Program in the Department of Radiation Oncology, University of Iowa, Iowa City, IA
2/2009-current	Associate Editor, Journal of Applied Clinical Medical Physics

### C. Honors and Awards

- 1997. U.S. Patent 5,663,999. Optimization of an intensity modulated field.
- 1998. U.S. Patent 5,724,403. Virtual compensator.
- 2000. U.S. Patent 6,052,430. Dynamic sub-space intensity modulation.
- 2000. U.S. Patent 6,097,787. System and method for calculating scatter radiation.
- 2000. U.S. Patent 6,108,400. System and method for using precalculated strips in calculating scatter radiation.
- 2000. U.S. Patent 6,128,366. Dosimetry error reduction for optimized static intensity modulation.
- 2000. U.S. Patent 6,134,296. Microgradient intensity modulating multi-leaf collimator.
- 2000. U.S. Patent 6,142,925. Method and system for increasing resolution in a radiotherapy system
- 2000. U.S. Patent 6,167,114. System and method for calculating scatter radiation including a collimator thickness.
- 2001. U.S. Patent 6,240,161. Multi-leaf collimator constrained optimization of intensity modulated treatments.
- 2001. U.S. Patent 6,314,159. System and method for optimizing radiation treatment with an intensity modulating multi-leaf collimator.
- 2001. U.S. Patent 6,330,300. High definition intensity modulating radiation therapy system and method.
- 2002. U.S. Patent 6,349,129. System and method for defining radiation treatment intensity maps.
- 2002. U.S. Patent 6,353,655. System and method for calculating fluence contributions from a source plane.
- 2002. U.S. Patent 6,449,335. System and method for optimizing radiation treatment with an intensity modulating multi-leaf collimator.
- 2002. U.S. Patent 6,473,490. Intensity map reconstruction for radiation therapy with a modulating multi-leaf collimator.
- 2003. U.S. Patent 6,577,707. Edge extension of intensity map for radiation therapy with a modulating multi-leaf collimator.
- 2003. U.S. Patent 6,661,871. System and method for optimizing radiation treatment with an intensity modulating multi-leaf collimator by minimizing junctions.
- 2004. U.S. Patent 6,757,355. High-definition radiation treatment with an intensity modulating multi-leaf collimator.
- 2004. U.S. Patent 6,813,336. High definition conformal arc radiation therapy with a multi-leaf collimator.
- 2005. U.S. Patent 6,907,282. Intensity map resampling for multi-leaf collimator compatibility.
- 2005. U.S. Patent 6,968,035. System to present focused radiation treatment area.

Honors

- 2000 Siemens, Inventor of the Year
- 2009 The Varian Editor in Chief Award of Excellence for the Best General Medical Physics Article- "Radiation therapy plan checks in a paperless clinic" JACMP 10(1) 43-62, selected by the JACMP Board of Editors

**II. TEACHING****A. Teaching assignments on semester by semester basis (least to most recent)**

- Summer 1985 Instructor, Introductory Physics  
Ateneo de Manila University Quezon City, Philippines
- Fall 1985 Lab Instructor, Introductory Physics  
Virginia Tech Blacksburg VA
- Spring 1986 Lab Instructor, Introductory Physics  
Virginia Tech Blacksburg VA
- Fall 1986 Lab Instructor, Introductory Physics  
Virginia Tech Blacksburg VA
- Spring 1987 Lab Instructor, Introductory Physics  
Virginia Tech Blacksburg VA
- Winter 1991 Visiting Assistant Professor, Introductory Physics  
Virginia Tech Blacksburg VA
- Fall 1991 Instructor, Fundamental Mathematics,  
Introductory Physics I, and Introduction to Computing  
Muskingum College New Concord OH
- Spring 1992 Instructor, Fundamental Mathematics,  
Introductory Physics II, and Elementary Functions  
Muskingum College New Concord OH
- Fall 1992 Instructor, Fundamentals Mathematics,  
Introductory Physics I, and Introduction to Experimental  
Physics I  
Muskingum College New Concord OH
- Spring 1993 Instructor, Fundamental Mathematics,  
Introductory Physics II, and Applied Mathematics  
Muskingum College New Concord OH
- Spring 2005 Assistant Professor, Medical Physics and Radiation  
Biology  
The University of Iowa Iowa City IA
- Fall 2005 Assistant Professor, Medical Physics and Radiation  
Biology  
The University of Iowa Iowa City IA
- Spring 2006 Assistant Professor, Medical Physics (RT/Residents),  
Radiation Biology and Medical Physics survey course (1  
lecture)

Fall 2006	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics/Dosimetry, MDCB review course
Spring 2007	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics/Dosimetry, MDCB review course
Fall 2007	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT/Residents)
Spring 2008	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT/Residents)
Fall 2008	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT/Residents)
Spring 2009	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT/Residents), Radiation Therapy Physics for MD Residents
Fall 2009	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT/Residents)
Spring 2010	The University of Iowa	Iowa City IA	Assistant Professor, Medical Physics (RT,Residents), Introduction to Radiological Physics and Dosimetry (for medical physics residents)
	The University of Iowa	Iowa City IA	

**B. Students supervised  
(name, degree objective, outcome)**

Chris Muraski, Middle Tennessee State University, Murfreesboro TN  
Earl Nixon, Medical Physics Resident, The University of Iowa, Iowa City IA  
James Sample, Medical Physics Resident, The University of Iowa, Iowa City IA  
Hemant Shukla, Medical Physics Resident, The University of Iowa, Iowa City IA  
William Kearney, Medical Physics Resident, The University of Iowa, Iowa City IA  
Xiaofei Ying, Medical Physics Resident, The University of Iowa, Iowa City IA  
Vibha Chaswal, Medical Physics Resident, The University of Iowa, Iowa City IA  
Junyi Xia, Medical Physics Resident, The University of Iowa, Iowa City IA  
Yunfei Huang, ¼ time research position, Graduate Student, PhD program in the Department of Physics, and Postdoctoral student in Radiation Oncology The University of Iowa, Iowa City, IA; currently a Medical Physics Resident  
Dan Hyer, Medical Physics Resident, The University of Iowa, Iowa City IA  
Mingqing Chen, Research Assistant, Graduate Student, PhD program in the Department of Electrical and Computer Engineering, The University of Iowa, Iowa City, IA

### C. Other contributions to institutional programs

## III. SCHOLARSHIP

### A. Publications or creative works (least to most recent) (Annotations are given only when the role is not as primary author.)

1. Epp JM, Dillard JG, Siochi RAC\*, Zallen R, Cole ED, Sen S, Vaseashta A, Burton LC. Characteristics of Si-Implanted (211) versus (100) GaAs. In: Rehn LE, Green JE, Smidt FA, editors. Processing and Characterization of Materials Using Ion Beams, MRS Volume 128. Pittsburgh: Materials Research Society; 1989. p. 677. \*provided optical data for materials
2. Epp JM, Dillard JG, Siochi RAC\*, Zallen R, Sen S, Burton LC. Effects of ion bombardment on the chemical reactivity of GaAs(100): variation of bombarding ion mass. *Chemistry of Materials* 1990;2:173. \*wrote/reviewed sections on optical data
3. Siochi RA, Elson HR, Foster AE, Lamba MA. A self-collimating convolution backprojection algorithm for optimizing dose distributions of I-125 prostate implants. *Med. Phys.* 1997;24:241-249.
4. Siochi RAC. Requirements for manufacturer supplied data for Monte Carlo simulation: a BEAM perspective. In: Duggan JL, Morgan IL, editors. Proceedings of the Fifteenth International Conference on the Application of Accelerators in Research and Industry. Denton, TX; 1998. pp. 1060-1065.
5. Siochi RA. Minimizing static intensity modulation delivery time using an intensity solid paradigm. *Int. J. Radiat. Oncol. Biol. Phys.* 1999;43:671-680.
6. Siochi RAC. A fluence correction method for intensity modulation. In: Proceedings of the 38ieme Congres - Societe Francaise des Physiciens d'Hopital; 1999. pp. 5-15.
7. Siochi RAC. Optimized decomposition of virtual micro intensity maps. In: Schlegel W, Bortfeld T, editors. Proceedings of the 13th International Conference on the Use of Computers in Radiation Therapy. Heidelberg, Germany; 2000. pp. 300-302.
8. Siochi RAC. Simultaneous minimization of segments and junctions in virtual micro IMRT. In: Proceedings of the 22nd Annual International Conference of the IEEE. Vol 1; 2000. pp. 452-455.
9. Siochi RAC. Virtual micro-intensity modulated radiation therapy. *Med. Phys.* 2000;27:2480-2493.
10. Saw CB, Siochi RC\*, Ayyangar KM, Zhen W, Enke CA. Leaf sequencing techniques for MLC-based IMRT. *Med. Dosim.* 2001;26:199-204. \*Reviewed the whole paper, added and edited sections.
11. Siochi RAC. Problem directed optimization methods for radiation oncology physics. In: Radiation Oncology Physics 2001:FSRC Book of Abstracts, pp. 65-71; 2001.

12. Azcona JD, Siochi RA\*, Azinovic I. Quality assurance in IMRT: importance of the transmission through the jaws for an accurate calculation of absolute doses and relative distributions. *Med. Phys.* 2002;29:269-274. \*Planned and discussed the concepts in the paper, outlined the required data and experiments, added sections, reviewed and edited the whole paper.
13. Potter LD, Chang SX, Cullip TJ, Siochi AC\*. A quality and efficiency analysis of the IMFAST segmentation algorithm in head and neck "step & shoot" IMRT treatments. *Med. Phys.* 2002;29:275-283. \*wrote sections on the IMFAST algorithm description, edited and reviewed the whole paper.
14. Siochi RA. Modifications to the IMFAST leaf sequencing optimization algorithm. *Med. Phys.* 2004;31:3267-3278.
15. Siochi RA. A variable depth recursion algorithm for leaf sequencing. *Med. Phys.* 2007;34:664-672.
16. Bayouth JE, Bylund KC, Siochi RA\*, Shukla HP, Nixon E, Buatti JM. Validation of treatment planning and delivery in conventional linear accelerator without flattening filter. submitted to *Int. J. Radiat. Oncol. Biol. Phys.* - \*rewrote sections, reviewed and edited the whole paper, created software (dosimetric comparison and analysis) tools that were used for the data analysis
17. Bylund KC, Bayouth JE, Smith MC, Siochi RA\*, Buatti JM. Geometric and dosimetric impact of interfraction prostate motion measured with megavoltage cone beam CT. submitted to *Int. J. Radiat. Oncol. Biol. Phys./in preparation for resubmission* - \*rewrote sections, reviewed and edited the whole paper, created software (dicom handling and reformatting) tools that were used for the data transfers
18. Bayouth JE, Bhatia S, Smith M, Jacobson G, Yao M, Siochi RA\*, Pennington E, Waldron T, Modrick J, Pelland D, Anderson K, Chesnut D, Bylund K, Buatti JM. Indication for Daily Image Guidance in Radiation Therapy Observed Using Megavoltage Cone Beam Computed Tomography. in preparation for submission to *Int. J. Radiat. Oncol. Biol. Phys.* \*created the methodology for CBCT prescriptions and provided in-service training to the physicians and therapists. Modified our physics check software to include CBCT calculations. Provided physics expertise for data preparation for adaptive targeting.
19. Nixon E, Bayouth JE, Siochi RA\*, Shukla HP. Evaluation of CT extended field of view imaging impact on radiation therapy treatment planning. submitted to *Med. Phys./in preparation for resubmission to JACMP* - \*wrote sections on the dosimetry tools used for comparisons, modified dosimetry tools, reviewed and edited major sections, provided guidance on the framework of the paper, mentored Earl Nixon through the writing process.
20. Siochi RA. Optimized removal of the tongue-and-groove underdose via constrained partial synchronization and variable depth recursion. *Phys Med Biol* 2009;54:1369-1381.
21. Siochi RA, Pennington E, Waldron T, Bayouth JE. Radiation therapy plan checks in a paperless clinic. *J. Appl. Clin. Med. Phys* 2009;10(1):43-62.

22. Siochi RA. Leakage reduction for the Siemens Moduleaf. *J. Appl. Clin. Med. Phys.* 2009;10(2): 139-149.
23. Flynn RT, Hartmann J, Bani-Hashemi A, Nixon E, Siochi RAC\*, Pennington EC, Bayouth JE. Dosimetric characterization and application of an imaging beam line with a carbon electron target for megavoltage cone beam computed tomography. *Med. Phys.* 2009;36:2181-2192. -\*performed post-installation tuning and peaking of IBL beamline and electron beams, created alternative configuration protocol, wrote new code in our in-house software to accommodate IBL, reviewed and edited the whole paper.
24. Siochi RA. Deriving motion from megavoltage localization cone beam computed tomography scans. *Phys Med Biol* 2009;54:4195-4212.
25. \*Siochi RA, Brack CD, Orton C. Point/Counterpoint: The chief Information Technology officer in a Radiation Oncology department should be a medical physicist. *Med. Phys.* 2009;36:3863-3865. -\*I wrote the proposition and the rebuttal of the counter argument of the debate. Authors for these articles are selected based on their expertise and are recognized as national leaders within the field of Medical Physics.
26. \*Siochi RA, Balter P, Bloch C, Bushe H, Curran B, Feng W, Kagadis G, Kirby T, Mayo C, Stern R. Information technology resource management in radiation oncology. AAPM WGIT white paper, *J. Appl. Clin. Med. Phys.* 2009;10(4): 16-35.\* Wrote the outline, wrote 4 sections, edited all the other contributed sections, and provided leadership to the WGIT writing group.
27. Chen M and \*Siochi RA. Diaphragm Motion Quantification in megavoltage cone-beam CT Projection Images. *Med Phys* 2010; 37(5): 2312-2320. \*Senior author, co-developed and tested software interface and algorithms, provided mentorship to the first author.
28. Siochi RA. In Regards to Dr. Redmond et al. *Int. J. Radiat. Oncol. Biol. Phys.* 2010;77:1605.
29. Chen M, \*Siochi RA. A clinical feasibility study on respiratory sorted megavoltage cone beam ct. In: Brown M, Bruijne Md, Ding K, Ginneken Bv, Kiraly A, Kuhnigk J-M, McClelland J, Mori K, Reinhardt J, editors. *The Third International Workshop on Pulmonary Image Analysis*; Beijing, China: CreateSpace; 2010. p. 83-94. \*Senior author, gathered data, co-developed and tested software interface and algorithms, provided mentorship to the first author.
30. Huang Y, Bayouth JE, Flynn RT, \*Siochi RA. NON-flattened Photon Beam Planning and Delivery for Hypofractionated Gated IMRT. submitted to *Med Phys* in 2010. \*provided IMRT sequencing statistics methodology and edited the paper.
31. \*Siochi RA, Balter P, Bloch C, Blodgett K, Curran B, Engelsman M, Feng W, Mechalakos J, Pavord D, Santanam L, Simon T, Sutlief S, Zhu XR. A rapid communication from the American Association of Physicists in Medicine Task Group 201: Recommendations for the QA of External Beam Radiotherapy Data Transfer. Approved by AAPM TPC for submission to *Med Phys* or

JACMP\* Gathered recommendations into a database, wrote the outline, wrote the first draft, and provided leadership to TG201.

32. Chen M, \*Siochi RA. Feasibility of Using Respiratory Sorted Mega Voltage Cone Beam Computed Tomography to Identify Tumor Motion and Volume. In preparation for submission to JACMP Oct. 2010. \*Senior author, gathered data, co-developed and tested software interface and algorithms, provided mentorship to the first author.

### Book Chapters

1. Siochi RA. Information resources in radiation oncology. Chapter 11 of the book Informatics in Radiation Oncology, Taylor and Francis, 2009. In Press, publication date 4/15/2011

### Non-Peer Reviewed Papers

1. Siochi RAC, "Optical characterization of processed gallium arsenide," PhD Thesis, Virginia Tech Dept. of Physics, December 1990.
2. Siochi RAC, "A self-collimating convolution backprojection algorithm for brachytherapy optimization," MS Thesis, University of Cincinnati, February 19, 1995.
3. Bayouth JE, Celi JC, Hoban P, Marles A, Siochi RAC, Yang J, "An Introduction to IMRT," Online Article, January 25, 2004, <http://www.oncolink.org/treatment/article.cfm?c=5&s=33&id=225>.
4. Siochi RAC. "Validation of 4D Radiation Therapy," acs seed grant application, 2006
5. Siochi RAC. "Order Up More Images," Advance for Imaging and Radiation Oncology, 2010; 20(4):17.

### Abstracts

1. Siochi RAC, "Leaf Sequencing Optimization for Static IMRT," *Med. Phys.* 1998;25, A200-A200
2. Siochi RAC, "Accuracy and Time Considerations in Intensity Modulation Treatment Planning," *Med. Phys.* 1999;26, 1086-1086
3. Siochi RAC, "Virtual Micro IMRT," *Med. Phys.* 1999; 26, 1096-1096
4. Siochi RAC, "Monitor Unit Scaling in IMRT," *Med. Phys.* 2001;28, 1283-1283
5. Siochi R. An improved IMFAST algorithm. *Med. Phys.* 2002;29:1334-1334
6. Siochi R. A variable depth recursion algorithm for leaf sequence optimization. *Med. Phys.* 2003;30:1404-1404.
7. Sontag M, Siochi R, Zhu Y, Samant S, Crawford B, Coffey D, Ying X, Merchant T. Dosimetric significance of MLC leaf width reduction in the treatment of infratentorial ependymoma. *Med. Phys.* 2003;30:1398-1398.

8. Siochi RC, Crawford B. Pixel value to dose conversion errors can reject acceptable IMRT plans. *International Journal Of Radiation Oncology Biology Physics* 2004;60:S625-S625.
9. Siochi RAC, "Simplifying IMRT plans through efficient segmentation," *Med. Phys.* 2005;32, 2085-2085
10. Bayouth JE, Sample J, Waldron T, Siochi R, "Evaluation of 4DRT: CT Acquisition and Gated Delivery System," *48<sup>th</sup> AAPM Annual Meeting, Online Program (2006)*
11. Siochi R, "Optimized Removal of the Tongue-and-Groove Underdose Via Constrained Partial Synchronization and Variable Depth Recursion," *48<sup>th</sup> AAPM Annual Meeting, Online Program (2006)*
12. Bayouth J, Shukla H, Pavord D, Nixon E, Siochi R, "Treatment Planning Modeling and Dose Delivery Advantage of Standard Linac Without Flattening Filter," *49<sup>th</sup> AAPM Annual Meeting, Online Program (2007)*
13. Nixon E, Shukla H, Siochi R, Bayouth J "Evaluation of CT Extended Field of View Imaging Impact on Radiation Therapy Treatment Planning," *49<sup>th</sup> AAPM Annual Meeting, Online Program (2007)*
14. Siochi R, "A Projection Point Tracking Method for Gated 4DRT Validation," *49<sup>th</sup> AAPM Annual Meeting, Online Program (2007)*
15. Bayouth J, Bylund K, Siochi R "Validation of Treatment Planning and Delivery in Conventional Linear Accelerator Without Flattening Filter," TU-EE-A1-2, *50<sup>th</sup> AAPM Annual Meeting, Online Program (2008)*
16. Monroe W, Kim Y, Christensen G, Wu X, Bayouth J, Bhatia S, McGuire S, Siochi R, Waldron T "Using Small-Deformation Linear-Elastic Registration to Quantifying Ventilation-Competent Lung Imaging from Clinical 4DCT Datasets: Toward Selective Avoidance IMRT for Locally Advanced Non-Small-Cell Lung Cancer," SU-GG-J-193, *50<sup>th</sup> AAPM Annual Meeting, Online Program (2008)*
17. Siochi R, Shukla H. "Dosimetric Error from Inter-fraction Tumor Motion Variation in Phase Based Gating," SU-GG-T-220, *50<sup>th</sup> AAPM Annual Meeting, Online Program (2008) (poster)*
18. Siochi R, Huang Y, Bayouth J, "Assessment of an In-House Independent Phantom Dose Calculation Algorithm for IMRT QA," WE-D-AUD-B3, *50<sup>th</sup> AAPM Annual Meeting, Online Program (2008) (oral)*
19. Song Q, Yin Y, Chen M, Kim Y, Bayouth J, Buatti J, Siochi RAC, Sonka M, Wu X, "Simultaneous Segmentation of Bladder and Prostate using Globally Optimal 3-D Graph Search Method," *International Journal Of Radiation Oncology Biology Physics* 2008;72:S148.
20. Bylund KC, Bayouth JE, Smith MC, Siochi RA, Buatti JM, "Geometric and Dosimetric Impact of Interfraction Prostate Motion Measured with Megavoltage Cone Beam CT," *International Journal Of Radiation Oncology Biology Physics* 2008;72:S338.

21. Siochi R, Kim Y, Bhatia S, "Tumor Control Probability (TCP) Reduction in Phase Gated RT Treatments of Non-Small-Cell Lung Cancer (NSCLC) Tumor with Motion in Excess of Planned Motion," *International Journal Of Radiation Oncology Biology Physics* 2008;72:S49. (oral)
22. Siochi R, "Assessment of An Interpolated Ray Trace Algorithm for Deriving Motion From CBCT Scans," SU-FF-J-78, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (poster)*
23. Monroe W, Kim Y, Siochi R, Wu X, "Quantification of Ventilation Imaging From Clinical 4DCT Datasets for Selective Avoidance IMRT in Non-Small Cell Lung Cancer," SU-FF-J-171, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (poster)*
24. Huang Y, Flynn R, Siochi R, Bayouth J, "Quality Evaluation of Unflattened Photon Beam Model," SU-FF-T-646, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (poster)*
25. Chen M, Siochi R, "A Diaphragm Tracking Algorithm for Megavoltage Cone Beam CT Projection Data," TH-C-303A-7, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (oral)*
26. Flynn R, Hartmann J, Bani-Hashemi A, Nixon E, Siochi R, Pennington E, Bayouth J, "Dosimetric Characterization of An Imaging Beam Line with a Carbon Electron Target for Megavoltage Cone Beam Computed Tomography," TH-D-BRC-2, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (oral)*
27. Siochi R, Chaswal V, Ying X, "A CBCT Projection Matrix Method for Radiation and Imaging Isocenter QA," TU-D-BRB-8, *51<sup>st</sup> AAPM Annual Meeting, Online Program (2009) (oral)*
28. Siochi R, "Information Technology Resource Management in the Image Guidance Era," *Society for Radiation Oncology Administrator's (SROA) 26th Annual Meeting (2009) (oral)*
29. Siochi R, "DICOM- an Overview with an Emphasis on Therapy," WE - SAM-SAM BRB - Educational Course - Therapy: Data Flow and Management in Radiation Therapy, *52<sup>nd</sup> AAPM Annual Meeting, Online Program (2010) (oral)*
30. S Mutic, R Siochi, E Furhang, D Rangaraj, B Fraass, "Safety in Radiation Therapy," WE-E-BRB-1, *52<sup>nd</sup> AAPM Annual Meeting, Online Program (2010) (oral)*

## **B. Areas of Research Interest and Current Projects**

1. Leaf Sequence optimization for Intensity Modulated Radiation Therapy
2. Virtual Micro Intensity Modulated Radiation Therapy
3. Fluence source models and fluence calculation algorithm development
4. Model based segmentation and 4D treatment planning
5. 4D cone beam reconstruction from daily 3D cone beam data

6. Adaptive phase-based gating 4DRT

**C. Published reviews of Scholarship**

**D. Grants Received**

4DCT- total \$109,243, Aug 2006, 12 months, Siemens grant.

Co-Investigator (10%) (PI: John Bayouth)

On-line Image guidance for Precision Therapy. – total \$82,290, Aug 2006, 12 months, Siemens grant. Co-Investigator (10%) (PI: John Bayouth)

**E. Invited Lectures, Conference Presentations, Visiting Professorships**

1. Siochi RAC, Zallen R. "Raman Scattering Comparison of Si-Implanted (211) and (100) GaAs," 1989 March Meeting of the American Physical Society, St. Louis, Missouri, March 1989.
2. Siochi RAC, Zallen R, Sen S, Burton LC. "The Structural Recovery and Electrical Activation of Si-Implanted GaAs as a Function of Anneal Temperature," 1992 March Meeting of the American Physical Society, Indianapolis, IN, March 1992.
3. Siochi RAC. "Estimating Phonon Dispersion Curves for Nanocrystalline Solids from Shifted and Broadened Raman Peaks," 1993 March Meeting of the American Physical Society, Seattle, Washington, March 1993.
4. Siochi RAC. "Fluence Error Reduction for Static IMRT by Segment Weighting," AAPM Annual meeting, San Antonio, Texas, August 9-13, 1998.
5. Siochi RAC. "A Fast Head Scatter Calculation Algorithm for Static IMRT," AAPM Annual meeting, San Antonio, Texas, August 9-13, 1998.
6. Siochi RAC, "Leaf Sequencing Optimization for Static IMRT," AAPM Annual meeting, San Antonio, Texas, August 9-13, 1998.
7. Siochi RAC, "Accuracy and Time Considerations in Intensity Modulation Treatment Planning," AAPM Annual meeting, Nashville, Tennessee, July 25-29, 1999.
8. Siochi RAC, "Virtual Micro IMRT," AAPM Annual meeting, Nashville, Tennessee, July 25-29, 1999.
9. Siochi RAC. "An Overview of Siemens' IMRT Approach," First Community Hospital IMRT Symposium and Workshop, September 15, 2000.
10. Siochi RAC. "The Future of Radiotherapy - An Historical Perspective," SATRO, May 2001.
11. Siochi RAC. "Controle de Qualidade - Radioterapia conformacional IMRT (Quality Control in conformational radiotherapy and IMRT)," Radioterapia de Última Geração, Sirio-Libanês Hospital, São Paulo, Brazil, June 28, 2001.

12. Siochi RAC. "IMRT - Conceitos Físicos (Physics concepts in IMRT)," Radioterapia de Última Geração, Sirio-Labanes Hospital, São Paulo, Brazil, June 28, 2001.
13. Siochi RAC, "Monitor Unit Scaling in IMRT," AAPM Annual meeting, Salt Lake City, Utah, July 22-26, 2001.
14. Siochi RAC. "IMRT with Siemens: Materials and Methods," Second Community Hospital IMRT Symposium and Workshop, September 29, 2001.
15. Siochi RAC. "The Effect of Using Integral Monitor Units in Intensity Modulation," VI Congresso Brasileiro de Física Médica, October 4, 2001.
16. Siochi RAC. "Terapia com Modulação de Intensidade de Feixe (therapy with field intensity modulation)," VI Congresso Brasileiro de Física Médica, October 4, 2001.
17. Siochi RAC. "Novas Tecnologias em Radioterapia (new technology in radiotherapy)," VI Congresso Brasileiro de Física Médica, October 4, 2001.
18. Siochi RAC. "Leaf Sequencing in IMRT," Fox Chase Cancer Center IMRT short course, April 2002.
19. Siochi RAC, Prosser S, Johnson S, Riker R. "Technical Aspects in IMRT," AFROC, April 8, 2002.
20. Siochi RAC. "An Improved IMFAST Algorithm," WE-C-517A-1, AAPM Annual Meeting, Montreal, Canada, July 14-18, 2002.
21. Siochi RAC. "Collimador Multi-Lamina: Uso e Controle de Qualidade," II Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, August 16, 2002.
22. Siochi RAC. "Novas Perspectivas Tecnológicas," II Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, August 16, 2002.
23. Siochi RAC. "IMRT Delivery Systems: Siemens Specific Issues," IMRT Practicum at Sea, University of Florida, January 12, 2003.
24. Siochi RAC. "A Multi-layer Complexity Model for Leaf Sequence Optimization," Optimization in Radiation Therapy Symposium, University of Florida, January 13, 2003.
25. Siochi RAC. "Posicionamento e Imobilização," III Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, July 10, 2003.
26. Siochi RAC. "Implementação Clínica do IMRT," III Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, July 10, 2003.
27. Siochi RAC. "Imagens: Anatômica e Funcional para 3DCRT e IMRT," III Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, July 10, 2003.
28. Siochi RAC. "O Uso de Filmes em QA," III Curso de Radioterapia de Última geração, Hospital Sirio-Libanes, São Paulo, Brazil, July 10, 2003.

29. Siochi RAC. "A Variable Depth Recursion Algorithm for Leaf Sequence Optimization," TU-D20B-1, 45th AAPM Annual Meeting, San Diego, California, August 10-14, 2003.
30. Siochi RAC, "Simplifying IMRT plans through efficient segmentation," invited presentation, TU-C-T-6C-3, 47th AAPM annual meeting, Seattle, WA, July 24-28, 2005
31. Siochi RAC, "Model Based Segmentation," Missouri River Valley AAPM chapter meeting, Nov. 5, 2005
32. Siochi RAC, "Model Based Segmentation for Treatment Planning," HCCC Forum, University of Iowa, Nov. 15, 2005
33. Siochi RAC. "Optimized Removal of the Tongue-and-Groove Underdose Via Constrained Partial Synchronization and Variable Depth Recursion," TU-D-ValA-9, 48<sup>th</sup> AAPM Annual Meeting, Orlando, FL, July 30 - August 3, 2006
34. Siochi RAC. "IMRT QA and Clinical Studies," Hypofractionated radiotherapy: tools, techniques. Biological rationales and clinical applications, Rome, April 19-21 2007
35. Siochi RAC. "IMRT Planning, Verification, and Delivery," Hypofractionated radiotherapy: tools, techniques. Biological rationales and clinical applications, Rome, April 19-21 2007
36. Siochi RAC. "A Projection Point Tracking Method for Gated 4DRT Validation," MO-E-M100F-3, 49<sup>th</sup> AAPM Annual Meeting, Minneapolis, MN, July 22 - July 26, 2007
37. Siochi RAC. "Future Directions in IGRT," JASTRO, Fukuoka, Japan, December 13 2007
38. Siochi RAC. "The Future of IGRT," California State University, Fresno, CA, March 13 2008
39. Siochi R, Huang Y, Bayouth J, "Assessment of an In-House Independent Phantom Dose Calculation Algorithm for IMRT QA," WE-D-AUD B-3, 50<sup>th</sup> AAPM Annual Meeting, Houston, TX, July 27-31, 2008.
40. Siochi R, Kim Y, Bhatia S, "Tumor Control Probability (TCP) Reduction in Phase Gated RT Treatments of Non-Small-Cell Lung Cancer (NSCLC) Tumor with Motion in Excess of Planned Motion," Oral presentation 106, 50<sup>th</sup> ASTRO Annual Meeting, Boston, MA, Sept 21-25, 2008.
41. Siochi RAC, "Evolution of IMRT QA at the University of Iowa: From measurement to calculation," Missouri River Valley AAPM chapter meeting, Oct 4, 2008
42. Siochi RAC, "Estimating TCP reductions using strain gauge data and projection data from localization MV CBCT scans in gated RT," Missouri River Valley AAPM chapter meeting, Oct 4, 2008
43. Siochi R, Chaswal V, Ying X, "A CBCT Projection Matrix Method for Radiation and Imaging Isocenter QA," TU-D-BRB-8, 51<sup>st</sup> AAPM Annual Meeting, Anaheim, CA, July 25-29 (2009)

44. Siochi RAC, "Clinical Workflow and Software for Patient QA in a Paperless Radiation Oncology Department," invited lecture, Washington University, St. Louis, Oct 2, 2009.
45. Siochi R, "Information Technology Resource Management in the Image Guidance Era," *Society for Radiation Oncology Administrator's (SROA) 26th Annual Meeting, Chicago, IL, Nov 4, 2009.*
46. Siochi RAC, "Failure Modes and Effects Analysis (FMEA) for Radiation Medicine," *Radiological and Medical Physics Society of New York, Annual Meeting, New York, NY, April 30, 2010.*
47. Siochi R, "The Function of the Radiation Team - Physicist," *Safety in Radiation Therapy, a Call to Action, Miami, FL, June 24, 2010.*
48. Siochi R, "Education, Experience, and the Maintenance of Competence - What is Needed: (2) Implementing New Technology," *Safety in Radiation Therapy, a Call to Action, Miami, FL, June 24, 2010.*
49. Siochi R, "DICOM- an Overview with an Emphasis on Therapy," WE - SAM-SAM BRB - Educational Course - Therapy: Data Flow and Management in Radiation Therapy, *52<sup>nd</sup> AAPM Annual Meeting, Philadelphia, PA, July 22, 2010*
50. S Mutic, R Siochi, E Furhang, D Rangaraj, B Fraass, "Safety in Radiation Therapy," WE-E-BRB-1, *52<sup>nd</sup> AAPM Annual Meeting, Philadelphia, PA, July 22, 2010*
51. Siochi RAC, "An Introduction to Failure Modes and Effects Analysis in Radiation Therapy," *Missouri River Valley AAPM Chapter Meeting, Kansas City, MO, October 16, 2010.*

**F. Pending Decisions (Grants, patents submitted/in preparation for resubmission)**

PI, Verification of 4D Radiation Therapy, NIH R21 grant proposal  
1R21CA133975-01 (submitted with mixed reviews, resubmitted as an R01)

PI, Calibration of a strain gauge gating system for 4DRT via cone beam computed tomography projection data, NIH R01 grant proposal (submitted June 2009, resubmitted November 2009, not granted but will be converted to a clinical research program and submitted as a different R01)

System and Method for Adaptive Gating via Cone Beam Computed Tomography (CBCT) Based Calibration of Tumor Motion Surrogates, patent submitted, UIRF #09042

#### IV. SERVICE

##### A. Memberships/Positions in Professional Organizations

1993-current	American Association of Physicists in Medicine (AAPM)
2004-2008	Children's Oncology Group
2007-current	Chair, Working Group on Information Technology in Radiation Oncology of the QAOIS WG of the AAPM
2007-current	Member, Quality Assurance Subcommittee of the AAPM
2008-current	American Society for Therapeutic Radiology and Oncology (ASTRO)
2008-current	Member, ASTRO Multidisciplinary QA committee
2010-current	Chair, AAPM Task Group No. 201: Quality Assurance of External Beam Treatment Data Transfer
2010	Question Writer, American Board of Radiology, Radiation Therapy Exam (Part II)
2010	AAPM Therapy representative at the American Board of Radiology Foundation annual symposium: Improving Patient Care through e-Communication in Imaging

##### B. UIHC Committees

2005-current	RTT Student Selection Committee
2005-current	RTT Advisory Committee
2006-current	Equipment Management Work group (Representative for Radiation Oncology)
2006-2010	Conflict of Interest Advisory Group (Subcommittee, Continuing Medical Education Committee)
2006-current	Medical Physics Resident Selection Committee
2006-current	Medical Physics Resident Advisory Committee

##### C. Papers Reviewed

2005 & prior	over a dozen papers for the Red Journal and Medical Physics
2006	3 papers for Medical Physics
2007	1 paper for Operations Research
2008	1 paper each for JACMP, PMB, Operations Research, Medical Physics
2009	Reviewer for Book proposal (informatics in radiation oncology, Taylor and Francis), JACMP(3 as reviewer, 3 as Associate Editor), Operations Research(1), Medical Physics(3), PMB(2)
2010	Medical Physics(2), PMB(2), JACMP (4 as AE), Radiotherapy and Oncology(1)

##### D. Grants Reviewed

2008	Carver Grants (CCOM Pilot 08, Pre-Med 08)
2008	PIMRON panel, DOD, CDMRP (Sept 7-9, 2008)
2009	CCOM M1 students 09, Radiation Biology students' mock grants
2010	PIM-1 panel, DOD, CDMRP (August 1-3, 2010)