

Curriculum Vitae

Murshed Hossain, Ph. D.

Medical Physicist / Associate Member
Fox Chase Cancer Center
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Philadelphia, PA 19111
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Education:

Ph. D. in Physics (December 1983)
College of William and Mary, Williamsburg, Virginia.
Research Field: Computational Plasma Physics and Turbulence

M. S. in Physics (May 1981)
College of William and Mary, Williamsburg, Virginia.

M. Sc. in Physics (December 1976)
University of Dacca, Dhaka, Bangladesh
Research Field: Experimental Solid State Physics

B. Sc. (Honors) in Physics (December 1975)
University of Dacca, Dhaka, Bangladesh
Subsidiary (Minor): Mathematics and Chemistry

Employment History:

Medical Physicist / Associate Member (January 2007 – present)
Fox Chase Cancer Center
Philadelphia, Pennsylvania

2007) Director of Medical Physics, Frankford Hospital (February 2005- January

Assistant Professor of Medical Physics (December 2001- January 2007)
Instructor of Medical Physics (November 1999- November 2001)
Medical Physics Clinical Resident (June 1998- October 1999)
Department of Radiation Oncology
Thomas Jefferson University
Philadelphia, Pennsylvania

Assistant Professor of Physics (January 1998- June 1998)
Adjunct Faculty (January 1995- December 1997)
Department of Chemistry and Physics
Rowan University
Glassboro, New Jersey

Senior Research Scientist (September 1991- August 1997)

Research Scientist (October 1988- August 1991)

Bartol Research Institute

University of Delaware

Newark, Delaware

Concurrent Appointment:

Adjunct Faculty (January 1995- August 1997)

Rowan University

Glassboro, New Jersey

Associate Research Scientist (June 1985- September 1988)

Courant Institute of Mathematical Sciences,

New York University

New York, New York

Staff Scientist (December 1983- June 1985)

Institute for Computer Applications in Science and Engineering (ICASE)

NASA Langley Research Center

Hampton, Virginia

Clinical Experience:

- Director of Medical Physics, Frankford-Torresdale Radiation Oncology facility housing 2 Varian multi-energy linacs (treating about 50-60 patients a day) and having a strong prostate brachytherapy program (about 8 implants a month). Responsible for all aspects of Radiation Therapy including QA, MU and dose calculation, planning, chart checks etc. Supervise one other Ph.D. physicists and two certified dosimetrists.
- Commissioned (including clinical implementation) the MIMiC-based IMRT program at the Jefferson main facility.
- Commissioned 2 multi-energy Elekta linacs (one at Jefferson and one at Riddle Memorial Hospital).
- Commissioned and implemented a diode-based in-vivo dosimetry program at Frankford Hospital.
- Commissioned a retrofit MLC to a Varian linac and a complete IMRT program, Dynamic wedge, EPID, Acculoc gold seed prostate localization system at the Frankford Hospital. Respiratory gating system is currently under development.
- Converted the Frankford Hospital clinic to film-less electronic charting.
- Extensive experience in using Varian and Philips/Elekta linacs; Philips-Pinnacle, CMS- Focus and MMS treatment planning systems; IMPAC record and verify system; Wellfofer data acquisition system; TLD calibration and dosimetry system.
- Some experience in LDR and HDR brachytherapy, TBI, IORT.

Current Clinical Research Interest:

Intensity Modulated Radiation Therapy, Image Guided Radiation Therapy,
Inverse and Forward Treatment Planning, Magnetic Resonance Spectroscopy, Total Body Irradiation, Modeling of Radiotherapy Beam Dose Computation, Modeling of Radiobiological Processes

Radiation safety committee, Frankford Hospital: Member (2003-2006)

Member, AAPM

Member, ASTRO

ABR: Board certification in Therapeutic Radiological Physics.

Publications:

Publications in Medical Physics:

1. “An optimized forward-planning technique for intensity modulated radiation therapy”, Y. Xiao, J. Galvin, **M. Hossain**, and R. Valicenti, *Medical Physics* **27**, 2093-2099 (2000).
2. “An investigation of a model of percentage depth dose for irregularly shaped fields”, **Murshed Hossain**, Ying Xiao, and M. Saiful Huq, *International Journal of Cancer (Radiation Oncology Investigations)* **96**, 140-145 (2001).
3. “Output Variation from an intensity modulating dynamic collimator”, **Murshed Hossain**, Chris Houser, James Galvin, *Medical Physics* **29**, 1693-1697 (2002).
4. “Isoeffect analysis for additional seed implant or external beam radiation supplementing an initial prostate implant using linear-quadratic model”, Hayeon Kim, **Murshed Hossain**, Chris Houser, David Suh, Adam P. Dicker, and Yan Chen, in Proceeding of the XIV International Conference on the Use of the Computers in Radiation Therapy (ICCR 2004), Seoul, May 10-13, 2004.
5. “Dosimetric investigation of high dose rate, gated IMRT”, Teh Lin, Yan Chen, **Murshed Hossain**, Jinsheng Li, and C.-M. Ma, *Medical Physics* **35**, 5079-5087 (2008).

Publications in Fluid and Plasma Turbulence:

1. Long-time states of inverse cascades in the presence of a maximum length scale, **Murshed Hossain**, William H. Matthaeus, and David Montgomery, *Journal of Plasma Physics*, 30, 479 (1983).
2. Forced magnetohydrodynamic turbulence in a uniform external magnetic field, **Murshed Hossain**, George Vahala, and David Montgomery, *Physics of Fluids*, 28, 3074 (1985).
3. Renormalization-group theory for the eddy viscosity in subgrid modeling, Ye Zhou, George Vahala, and **Murshed Hossain**, *Physical Review A*, 37, 2590 (1988).
4. A critical look at the use of filters in large eddy simulation, Ye Zhou, **Murshed Hossain**, and George Vahala, *Physics Letters A*, 139, 330 (1989).
5. Renormalized eddy viscosity and Kolmogorov's constant in forced Navier-Stokes turbulence, Ye Zhou, George Vahala, and **Murshed Hossain**, *Physical Review A* 40, 5865 (1989).
6. On the iterative averaging technique for subgrid modelling in large eddy simulation, Ye Zhou and **Murshed Hossain**, *Physics Letters A*, 151, 249 (1990).
7. Inverse energy cascades in three-dimensional turbulence, **Murshed**

Hossain,

8. Physics of Fluids B, 3, 511 (1991).
8. Non-diffusive sub-grid modeling of turbulence, **Murshed Hossain**, Physics Letters A, 161, 277 (1991).
9. Turbulent transport of a passive-scalar field by using a renormalization-group method, **Murshed Hossain**, Physical Review A, 46, 7608 (1992).
10. Reduction in the dimensionality of turbulence due to a strong rotation, **Murshed Hossain**, Physics of Fluids, 6, 1077 (1994).
11. Anisotropy and inverse cascades in homogeneous turbulence, **Murshed Hossain**, in Current Topics in the Physics of Fluids, Ed. J. C. Alexander and J. Menon, (Research Trends, Trivandrum, India, 1994), Vol. 1, p. 207.
12. Phenomenology for the decay of energy containing eddies in homogeneous MHD turbulence, **Murshed Hossain**, P. C. Gray, D. H. Pontius, Jr., W. H. Matthaeus, and S. Oughton, Physics of Fluids, 7, 2886 (1995).
13. Is the Alfvén-wave propagation effect important for energy decay in homogeneous MHD turbulence?, **Murshed Hossain**, P. C. Gray, D. H. Pontius, Jr., W. H. Matthaeus, and S. Oughton, in Solar Wind Eight, Ed. D. Winterhalter, J. T. Gosling, S. R. Habbal, W. S. Kurth, and M. Neugebauer, Proceedings of the Eighth International Solar Wind Conference, Dana Point, California, June 1995 (AIP Press, Woodbury, New York, 1996), p. 358.
14. Inverse cascades in incompressible fluid and magnetofluid turbulence, **Murshed Hossain**, Journal of Plasma Physics, 56, 467 (1996).
15. Scaling of Anisotropy in Hydromagnetic Turbulence, W. H. Matthaeus, Sean Oughton, Sanjoy Ghosh, and **Murshed Hossain**, Physical Review Letters 81, 2056, (1998).

Publications in Fusion Plasma Physics:

1. Anomalous transport and the coupling of plasma diffusion and heat flow, **Murshed Hossain**, Michael Kress, Pung Nien Hu, Albert A. Blank, and Harold Grad, Physical Review Letters, 58, 487 (1987).
2. Plasma transport by relaxation of localized perturbations, **Murshed Hossain**, Pung Nien Hu, Michael Kress, Albert A. Blank, and Harold Grad, Physics of Fluids, 31, 2165 (1988).
3. Effects of sawtooth oscillations on profile consistency and beta limit disruptions, H. R. Strauss and **M. Hossain**, Plasma Physics and Controlled Nuclear Fusion R Research 1988, Proceedings of the Twelfth International Conference, Nice (IAEA, Vienna, 1989), Vol. 2, p. 273.
4. Profile consistency in quasilinear and nonlinear high beta magnetohydrodynamic computations, **Murshed Hossain** and H. R. Strauss, Plasma Physics and Controlled Fusion, 32, 327 (1990).

Publications in Solar and Astrophysics:

1. New numerical solutions of three-dimensional compressible hydrodynamic convection, **Murshed Hossain** and D. J. Mullan, *strophysical Journal (Letters)*, 354, L33 (1990).
2. Three-dimensional compressible hydrodynamic convection in the sun and stars, **Murshed Hossain** and D. J. Mullan, *Astrophysical Journal*, 380, 631 (1991).
3. Simulation of compressible convection: A comparative study of boundary conditions, **Murshed Hossain** and D. J. Mullan, *Astrophysical Journal*, 416, 733 (1993).
4. Destabilization of compressible convection by radiation: quantitative evaluation, Q. Q. Cheng, **Murshed Hossain** and D. J. Mullan, *Astrophysical Journal*, 447, 789 (1995).
5. Cyclic convection in a zone bounded by stable layers, **Murshed Hossain** and D. J. Mullan, *Physical Review E*, 55, 2769 (1997).

Publications in Numerical Methods:

1. On computing high order Galerkin products, **Murshed Hossain**, William H. Matthaeus, and Sanjoy Ghosh, *Computer Physics Communications*, 69, 1 (1992).
2. The application of spectral methods in simulating compressible fluid and magnetofluid turbulence, Sanjoy Ghosh, **Murshed Hossain**, and William H. Matthaeus, *Computer Physics Communications*, 74, 18 (1993).

Other Publications:

1. Moving frame and the Doppler effect in mechanical waves, **Murshed Hossain**, *Physics Education*, 31, 12 (1996). (A Letter to the Editor)
Erratum: *Physics Education*, 31, 197 (1996).
2. Plane mirror-images: A Psycho-cultural confusion, **Murshed Hossain**, *Physics Education*, 31, 136 (1996). (A Letter to the Editor)

CONFERENCE PRESENTATIONS:

Before 1998: (29 Published Abstracts- not listed here)

Conference Presentations (After 1998): (Published Abstracts only)

1. "Verification of Field Placement for Rotational IMRT", M. S. Huq, G. Bednarz, **M. Hossain**, J. Galvin, W. Curran, Jr., AAPM Meeting,

- Nashville, TN, July 25-29, 1999, Paper No. PO-T-57, Abstract: Med. Phys. **26**, 1136, 1999.
2. "A Dosimetric Issue for Intensity Modulated Radiation Therapy", **M. Hossain**, M. S. Huq, J. Galvin, AAPM Meeting, Nashville, TN, July 25-29, 1999, Paper No. PO-T-69, Abstract: Med. Phys. **26**, 1139, 1999.
 3. "A Comparison of the AAPM TG51 Protocol and the IAEA Absorbed-Dose-to Water Based Code of Practice for Dosimetry Calibration of High Energy Photon Beams", M. S. Huq, **M. Hossain**, P. Andreo, AAPM Meeting, Nashville, TN, July 25-29, 1999, Paper No. PO-T-141, Abstract: Med. Phys. **26**, 1153-1154, 1999.
 4. "A Fast Model for the Prediction of the PDD/TPR of Irregularly Shaped Fields from Just a Few Physical Parameters", Y. Xiao, M. S. Huq, **M. Hossain**, AAPM Meeting, Nashville, TN, July 25-29, 1999, Paper No. PO-T-216, Abstract: Med. Phys. **26**, 1168, 1999
 5. "Time Dependent Effects in the Linear-Quadratic Model and Evolutionary Time Factor", **M. Hossain** and D. Leeper, Oral presentation at the World Congress on Medical Physics and Biomedical Engineering, Chicago, July 23-28, 2000, Paper No. MO-G313-6.
 6. "Calculating Combined Dose Distributions and Dose-Volume Histograms for Sequential and Concurrent Boosts When Inverse Planning is Used for IMRT", **M. Hossain**, G. Bednarz, Y. Xiao, and G. Galvin, Oral presentation at the World Congress on Medical Physics and Biomedical Engineering, Chicago, July 23-28, 2000, Paper No. FR-B309-3.
 7. "The effect of switch rates on the dose output from an intensity modulating dynamic multileaf collimator", **M. Hossain**, C. Houser, and J. Galvin, Oral presentation at the AAPM Meeting, Salt Lake City, UT, July 22-26, 2001, Paper No. WE-C-BRB-7, Abstract: Med. Phys. **28**, 1283, 2001.
 8. "Isoeffect analysis for additional seed implant or external beam radiation supplementing an initial prostate implant using linear-quadratic model", Hayeon Kim, **Murshed Hossain**, Chris Houser, David Suh, Adam P. Dicker, and Yan Chen, in Proceeding of the XIV International Conference on the Use of the Computers in Radiation Therapy (ICCR 2004), Seoul, May 10-13, 2004.
 9. "Dosimetric Investigation of High Dose Rate, Gated IMRT", Teh Lin, Yan Chen, **Murshed Hossain**, Jinsheng Li, and C-M Ma, Presented at the Asian-Pacific Congress of Medical Physics, June 21-22, 2008, Taipei, Taiwan, Paper No. <S1>.
 10. "An Improved Demons Algorithm by Incorporating Accurate Voxel Motion Calculation", Q Xu, J Fan, L Chen, **M Hossain**, Z Chi, L Jin, T Lin, A Eldib, J Li, and C Ma, AAPM Meeting, Houston, TX, July 27-31, 2008, Paper No. SU-GG-J-27, Abstract: Med. Phys. **35**, 2684, 2008.

11. "Daily Localization of Moving Targets with Non-Gated Cone-Beam CT Imaging",
T Lin, K Paskalev, Y Chen, **M Hossain**, Q Xu, and C Ma, AAPM Meeting, Houston, TX, July 27-31, 2008, Paper No. SU-GG-J-64, Abstract: Med. Phys. **35**, 2693, 2008.
12. "The Role of MRS in Radiation Therapy: Correlation Between T2-Weighted MRI, Biopsy and MRS", **M Hossain**, L Chen, M Buyyounouski, B Milestone, T Richardson, and C Ma, AAPM Meeting, Houston, TX, July 27-31, 2008, Paper No. SU-GG-J-180, Abstract: Med. Phys. **35**, 2721, 2008.
13. "A Feasibility Study of CT-Based IMRT Planning for Total Body Irradiation",
M Hossain, Y Chen, J Fan, T Lin, R Price, J Li, and C Ma, AAPM Meeting, Houston, TX, July 27-31, 2008, Paper No. SU-GG-T-496, Abstract: Med. Phys. **35**, 2839, 2008.
14. "Developing Hardware and Software Tools for Advanced Mixed Beam Radiotherapy",
C Ma, J Li, J Fan, L Jin, A Eldib, R Price, L Wang, L Chen, **M Hossain**, Oral presentation at the AAPM Meeting, Houston, TX, July 27-31, 2008, Paper No. TH-D-AUD B-04, Abstract: Med. Phys. **35**, 2985, 2008.
15. "4D-CT Reconstruction Based on Accurate Vector Field Inter/Extrapolation",
Q. Xu, Y. Chen, L. Teh, **M. Hossain**, L. Jin, A. Eldib, Z. Chi, J. Fan, L. Chen, and C. Ma, ASTRO Annual Meeting, Boston, MA, Sept. 21-25, 2008, Paper No. 3020, Abstract: IJROBP **72**, S628, 2008.
16. "EPID Assisted, Amplitude-based, Gated Intensity Modulated Radiation Therapy (IMRT)", T. Lin, Y Chen, **M. Hossain**, and C. Ma, ASTRO Annual Meeting, Boston, MA, Sept. 21-25, 2008, Paper No. 3045, Abstract: IJROBP **72**, S639, 2008.
17. "Extensive Scalp Irradiation Technique using Modulated Electron Radiotherapy Delivered by Photon Multileaf Collimator", L. Jin, C. Ma, **M. Hossain**, R. Price, N. Nicolaou, A. Eldib, J. Fan, Z. Chi, Q. Xu, and J. Li, ASTRO Annual Meeting, Boston, MA, Sept. 21-25, 2008, Paper No. 3054, Abstract: IJROBP **72**, S643, 2008.