Lihui Jin, Ph.D.

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Education

05/2005 – 09/2009	Postdoctoral Training Radiotherapy Physics	Fox Chase Cancer Center, Philadelphia, USA
10/1999 – 05/2005	Ph.D. Accelerator Physics	University of Kansas, Lawrence, USA
09/1991 – 09/1994	M.S. Accelerator Physics	Institute of High Energy Physics, Beijing, China
09/1985 – 07/1989	B.S. Physics Electronic Techniques	Xi'an Jiaotong University, Xi'an, China

Board Certification

ABR Part 1 of the Radiologic Physics Examination (passed), Aug 2006

Work Experience

09/2009 – present	Associate member/ Medical physicist	Radiation Oncology Department Fox Chase Cancer Center, Philadelphia, USA
05/2005 – 08/2009	Medical Physics Resident /Research Associate	Chief Medical Physics Resident (03/2008 to 08/2009), Fox Chase Cancer Center, Philadelphia, USA
10/1999 – 05/2005	Graduate Research Assistant (Accelerator Physics)	University of Kansas, Lawrence, USA
01/1998 – 10/1999	Scientific Associate Accelerator Physics	European Laboratory for Particle Physics, Geneva, Switzerland
07/1989 – 01/1998	Staff Member Accelerator Physics	Institution of High Energy Physics, Beijing, China

Clinical Experience/Training

1. Associate member/medical physicist (09/2009 – present)

Chart check, treatment planning, In vivo dosimetry, machine QA, commissioning

2. Chief medical physics resident (03/2008 – 08/2009)
   Coordinating teaching, research and clinic duties for medical physics residents

3. Medical physics resident training (05/2006-08/2009)
   Machine QA (Monthly and Annual)
   Siemens Primus, Siemens Primart, Varian 21EX, Varian Trilogy
   IMRT QA (film and ion chamber measurement)

   Physics chart checking (initial and weekly)

   RT simulation and setup (CT, MRI, PET, BAT)

   Treatment planning including IMRT (XiO, Eclipse, CORVUS, Monte Carlo-based planning)

   Radiation dosimeters (ionization chambers, TLDs, film, MOSFET)

   Linac commissioning/acceptance testing
   Trilogy

   RTP commissioning/acceptance testing

   Stereotactic radiotherapy/radiosurgery (Radionics, Eclipse, QA)

   Brachytherapy planning and dosimetry
   Nucletron HDR, PLATO planning system

   Prostate implant
   I-125, VariSeed planning system

   TBI

   in vivo dosimetry (TLD, MOSFET)

   Record and verify systems (Mosaiq)

   Radiation protection and shielding design

Other Radiation Therapy Training at FCCC

1. Radiation oncology resident lectures (42 hours per year)

2. Weekly clinic/research medical physics resident training meeting (2 to 3 hours each week)

3. Organized group review/discussion of AAPM protocols

AAPM TG-29 (1986), AAPM TG-40 (1994), AAPM TG-45 (1994), AAPM TG-43 (2004), AAPM TG-53 (1998), AAPM TG-63 (2003), AAPM TG-65 (2004), AAPM TG-58 (2001), AAPM TG-50 (2001), AAPM TG-21 (1983), AAPM TG-25 (1991), AAPM TG-51 (1999)

4. Journal club (reviewing published papers, once a month)

Teaching Experienice at FCCC

1. 2009 - present, Instructor, Radiation Oncology Resident Physics Lecture

2. 2007 - 2008, Instructor, Radiation Oncology Resident Physics Lecture reviewing

3. 2007 - 2008, Instructor (assisting hands-on exercise), the annual Monte Carlo short course

Main Research Projects

08/2006 – present **Modulated Electron Radiotherapy (MERT)**

1. Investigation of characteristics of electron beam collimated using electron multileaf collimator.

2. Investigation of optimizing 3D CT image-based treatment plan of MERT using in-house developed Monte Carlo based inverse treatment planning system.

3. Commissioning of phase space data acquired from Monte Carlo beam simulation for Siemens Primus accelerator.

4. Dosimetric verification of modulated electron radiotherapy delivered using photon multileaf collimator. In this work, a Monte Carlo based inverse treatment planning was based on the 3D CT data of a “breast phantom” that mimics a breast cancer patient, and delivered with 22 segments, each associated with a particular energy and MU value. Rigorous film and ion chamber dosimetry was carefully established for the conversion from measurement reading to dose, and the results were employed for plan verification using the breast phantom and a solid water phantom. Comparisons between measurements and calculations in terms of isodose distributions, dose profiles and point doses showed excellent agreement. In conclusion, the pMLC is capable of accurately delivering the MERT plan as calculated by our MC-based treatment planning system.

5. Investigation of MERT application in the treatment of extensive scalp, chest wall and intact breast.

05/2005 – 08/2006 **Stereotactic Body Radiotherapy (SBRT)**

1. Investigation of optimal beam margin for lung cancer SBRT using Monte Carlo dose calculations in terms of minimization of radiation toxicity to normal tissues. In this work, effects of lung density, tumor size and number of beam portals on the optimal beam margin were thoroughly assessed through more than one hundred plan calculations for different clinical scenarios.

2. Investigation of limitations of commercial treatment planning system (TPS) with respect to heterogeneity correction accuracy for lung cancer SBRT through comparison of dose distributions/dose volume histograms calculated using Monte Carlo algorithm with those using the TPS. In this work, clinically treated patients with different tumor sizes and locations were selected for Monte Carlo calculations to assess heterogeneity correction accuracy of the TPS for different clinical scenarios.

10/1999 – 05/2005 **Coherent Beam-Beam Instability in Circular Accelerators**

1. Development of self-consistent beam-beam simulation computational code using particle in cell method.

2. Investigation of coherent instability in weak-strong beam-beam interactions

3. Investigation of coherent beam-beam tune shift of unsymmetrical beam beam interactions.

4. Strong-strong simulation study for the wire compensation of long-range beam-beam effect in LHC.

5. Investigation of beam-beam effects in eRHIC using a self-consistent beam beam simulation.

6. Investigation of importance of beam-beam tune spread to suppress collective beam-beam instability in Hadron Colliders.

7. Investigation of multipole compensation of long-range beam-beam interactions through minimization of nonlinearities in Poincare Maps of a storage-ring collider

01/1998 – 10/1999 **Beam Dynamics Study for Large Hadron Collider (LHC)**

1. Investigation of LHC dynamic aperture improvement via octupole spool pieces.

2. Investigation of system error correction with the resonance-free lattice in the LHC.

3. Investigation of optimal tunes via tune scans in terms of maximal dynamic aperture for the LHC at injection energy.

07/1989 – 01/1998 **Accelerator Design and Accelerator Physics**

1. Study on luminosity upgrade of Beijing Electron Positron Collider (BEPC).
2. Lattice design of Beijing Tau-Charm factory storage ring.
3. Lattice design of Beijing synchrotron light source.
4. Beam-based optics correction for BEPC.

Professional Memberships

1. Full member of American Association of Physicists in Medicine, AAPM (2007 - present) (Junior member 2006 – 2007)
2. Full member of Delaware Valley Chapter, AAPM (2007 – present)
3. Full member of North American Chinese Medical Physicists Association, NACMPA (2007 – present)
4. Member of American Physical Society, APS (2001 - 2005)

Awards

1. Student travel awards, PAC 2003
2. Outstanding staff price, Institute of High Energy Physics, Beijing, 1996
3. Best youth thesis, Chinese Academy of Sciences (CAS), 1994

Research Funding

CAS Basic Research Grant, PI, Chinese Academy of Sciences: KJ952-51-451, 1997 – 1998

Refereeing

1. Medical Physics

2. Physics in Medicine and Biology

3. Technology in Cancer Research and Treatment

4. Treatment and Journal of Applied Clinical Medical Physics

5. Radiotherapy and Oncology

6. Journal of Physics D: Applied Physics

Publications

Peer-reviewed Papers

1. W. Luo, J. Li, E. Fourkal, J. Fan, X. Xu, Z Chen, L. Jin, R. Price and C-M Ma, Dosimetric advantage of IMPT over IMRT for laser-accelerated proton beams, Phys. Med. Biol. (2008) 53: 7151-7166

2. L. Wang, S. Hayes, K. Paskalev, **L. Jin**, M. K. Buyyounouski, C.M. Ma and S. Feigenberg, Comparison and evaluation of the impact on daily dose coverage of stereotactic body radiotherapy using 4D CT and multiphase CT images in lung cancer, Int J Radiat Oncol Biol Phys (2008), accepted

3. J. Fan, K. Paskalev, L. Wang, **L. Jin**, J. Li, A. Eldeeb and C. Ma, Determine the output factors of stereotactic radiosurgery beams using both experimental and Monte Carlo method, Med. Phys. (2008), submitted

4. **L. Jin**, C. M. Ma, J. Fan, A. Eldib, R. A. Price, L. Chen, L. Wang, Z. Chi, Q. Xu, M. Sherif and J. Li, Dosimetric verification of modulated electron radiotherapy delivered using a photon multileaf collimator, Phys. Med. Biol. (2008) 53: 6009-6025

5. **L. Jin**, L. Wang, J. Li, W. Luo, S. J. Feigenberg and C.M. Ma, Investigation of optimal beam margins for stereotactic radiotherapy of lung-cancer using Monte Carlo dose calculations, Phys. Med. Biol. (2007) 52:3549-3561

6. J. Shi and **L. Jin**, Coherent instability of weak-strong beam-beam interactions, Nucl. Instr. & Meth. (2006) A **568**:566-577

7. **L. Jin** and J. Shi, Coherent beam-beam tune shift of unsymmetrical beam-beam Interactions with large beam-beam parameter, Phys. Rev. E (2005) **71** 036501:1-14

8. **L. Jin** and J. Shi, Strong-strong simulation study for the wire compensation of long-range beam-beam effect in LHC, Nucl. Instr. & Meth. (2005) A **550**:6-13

9. J. Shi, **L. Jin** and F. Wang, Study of beam-beam effects in eRHIC with self-consistent beam-beam simulation, Nucl. Instr. & Meth. (2005) A **555**:6-14

10. **L. Jin** and J. Shi, Importance of beam-beam tune spread to collective beam-beam instability in Hadron Colliders, Phys. Rev. E (2004) **69**, 036503:1-11

11. J. Shi, **L. Jin** and O. Kheawpum, Multipole compensation of long-range beam-beam Interactions with minimization of nonliearities In Poincare Maps of a storage-ring collider, Phys. Rev. E **69**, (2004) 036502:1-7

12. **L. Jin** and J. Shi, Beam-beam instability in case of strong-weak beam-beam interactions. AIP Conference Series (2003) Vol. 693 (1): 227-230

13. J. Shi and **L. Jin**, Multipole compensation of long-range beam-beam interactions, AIP Conference Series (2003) Vol. 693(1): 265-268

14. N. Huang, **L. Jin**, W. Liu, D. Wang, J. Wang and C. Yu, Lattice design of being τ-charm factory storage ring, High Energy Physics and Nuclear Physics, (China, ISSN: 0254-3052, C N: 11-1825), (1998) 22 (**12**):1165-1173 (Chinese with English abstract)

Peer-reviewed Abstracts

1. **L. Jin**, C. M. Ma, A. Eldib, J. Fan, Z. Chi and J. Li, Dosimetric verification of modulated electron radiotherapy delivery using photon multileaf collimator, AAPM 2008 annual meeting, accepted (oral)

2. **L. Jin**, C. Ma, Q. Xu, Z. Chi, J. Fan and J. Li, Geometrical uncertainty caused by prostate rotation during radiotherapy, AAPM 2008 annual meeting, accepted (general poster)

3. **L. Jin**, C. M. Ma, M. Hossain, N. Nicolaou, R. A. Price, A. Eldib, J. Fan, Q. Xu, Z. Chi and J. Li, Extensive scalp irradiation technique using modulated electron radiotherapy delivered by photon multileaf collimator, ASTRO 2008 annual meeting, accepted (poster)

4. Q. Xu, Y. Chen, T. Lin, **L. Jin**, A. Eldib, Z. Chi, J. Fan, L. Chen and C. M. Ma, 4D CT reconstruction based on accurate vector field inter/extrapolation, ASTRO 2008 annual meeting, accepted (poster)

5. J. Li, C. M. Ma, M. Buyyounouski, A. Pollack, E. Horwitz, S. Johnston, **L. Jin** and R. A. Price, Gains from the prostate motion monitoring during external beam radiation therapy in term of savings on treatment margin, ASTRO 2008 annual meeting, accepted (poster)

6. J. Fan, Q. Xu, **L. Jin**, A. Eldeeb, Z. Chi, L. Wang, P. Robert, L. Chen and C. M. Ma, Tumor control probability predictions for adaptive radiotherapy to hypoxic tumors, ASTRO 2008 annual meeting, accepted (poster)

7. Z. Chi, J. Li, **L. Jin**, J. Fan, T. Lin, Q. Xu and C. M. Ma, Evaluation of IMRT plans from three treatment planning systems based on independent Monte Carlo dose calculation, AAPM 2008 annual meeting, accepted (general poster)

8. Z. Chi, L. Wang, L. Chen, J. Fan, **L Jin** and C. M. Ma, Comparison of prostate IMRT plans from three commercial Treatment Planning Systems, AAPM 2008 annual meeting, accepted (general poster)

9. A. Eldib, **L. Jin**, J. Fan, T. Lin, J Li, C. M. Ma, Investigation of electron beam collimated by motorized electron multi leaf collimator (eMLC) designed for fixed and modulated electron beam therapy, AAPM 2008 annual meeting, accepted (general poster)

10. A. Eldib, **L. Jin**, Q. Xu, J. Fan, J. Li and C. M. Ma, An optimal jaw setting for an electron-specific multileaf collimator (eMLC) developed for modulated electron radiation therapy (MERT), AAPM 2008 annual meeting, accepted (general poster)

11. Q. Xu, J. Fan, L. Chen, M. Hossain, Z. Chi, **L. Jin**, T. Lin, A. Eldib, J. Li and C. M. Ma, An improved Demons algorithm by incorporating accurate voxel motion calculation, AAPM 2008 annual meeting, accepted (general poster)

12. C. M. Ma, J. Li, J. Fan, **L. Jin**, A. Eldib, R. Price, L. Wang, L. Chen and M. Hossain, Developing hardware and software tools for advanced mixed beam radiotherapy, AAPM 2008 annual meeting, accepted (oral)

13. J. Fan, E. Fourkal, A. Guemnie Tafo, I. Veltchev, J. Li, Q. Xu, T. Lin, L. Wang, K. Paskalev, **L. Jin** and C. M. Ma, Cellular radiosensitivity of laser accelerated protons: a feasibility study, AAPM 2008 annual meeting, accepted (general poster)

14. Abramowitz MC**,** Freedman G, **Jin L**, Nicolaou N, Ma C, Li J. Accuracy of Electron Dose Calculations for Breast Tumor Bed Boost, Oncology, April 2008, 4, supl 1, pg 31.

15. J. Li, R. Price, **L. Jin** and C. M. Ma, The Accuracy and stability of the Calypso System for prostate localization and motion tracking, AAPM 2008 annual meeting, accepted (general poster)

16. **L. Jin**, C. M. Ma, A. ElDib, J. Fan, T. Lin and J. Li, Characteristics of electron beams collimated by an electron multileaf collimator, Med. Phys. (2007) 34, p2643

17. **L. Jin,** C. M. Ma, A. ElDib, J. Fan, T. Lin and J. Li, 3D CT image-based treatment planning of modulated electron radiotherapy for breast cancer, Med. Phys. (2007) **34**, p2401

18. C. M. **Ma**, J. Li, **L. Jin**, A. ElDib, J. Fan, R. A. Price, G. Freedman, P. Anderson and N. Nicolaou, **Advanced Mixed Beam Treatment Techniques for Breast and Head and Neck Cancers,** International Journal of Radiation OncologyBiologyPhysics, (2007) **69** pS47

19. L. Wang, **L. Jin**, S. Hayes, K. Paskalev, M. Buyyounouski, and S. Feigenberg, **Dosimetric comparison of 4D and 3 multi-phase ct imaging for stereotactic body radiation therapy (SBRT) planning in lung cancer**, Med. Phys. (2007) **34**, p2384

20. T. Lin, Y. Chen, **L. Jin**, J. Fan and C. M. Ma, **Investigation of gated, high dose rate IMRT step and shoot delivery,** Med. Phys. (2007) **34**, p2626

21. T. Lin, J. Li, J. Fan, **L. Jin**, W. Luo, R. Price, L. Chen, E. Fourkal and C. M. Ma, **Investigation of the beam penumbra effect on IMRT dose conformity and uniformity,** Med. Phys. (2007) **34**, p2464

22. A. ElDib, **L. Jin**, J. Fan, J. Li and C. M. Ma, **Monte Carlo investigation of electron beams collimated by an electron-specific MLC for modulated electron radiotherapy,** Med. Phys. (2007) **34**, p2471

23. J. Fan, K. Paskalev, J. Li, E. Fourkal, **L. Jin**, T. Lin, W. Luo and C. M. Ma, **Impact of the isocenter shift as a function of couch and gantry angles on the stereotactic radiosurgery (SRS) dose",** Med. Phys. (2007) **34**, p2457

24. J. Fan, K. Paskalev, J. Li, L. Wang, L. Chen, R. Price, ***L. Jin***, A. ElDib and C. M. Ma, **Determination of output factors for stereotactic radiosurgery beams by Monte Carlo and measurements,** Med. Phys. (2007) **34**, p2522

25. J. Li, **L. Jin**, W. Xiong and C. M. Ma**, Is it still necessary to use a beam spoiler for breast radiation**, Med. Phys. (2007) **34**, p2465

26. **L. Jin**, C. M. Ma, J. Li and L. Wang, Evaluation of dose calculation of SRT/IMRT for small lung lesions using Monte Carlo simulations, Med. Phys. (2006) **33,** p2215

27. **L Jin**, C. M. Ma, J. Li and L. Wang, Determination of beam margins for SRT/IMRT of small lung cancers based on Monte Carlo simulations, Med. Phys. (2006) **33**, p1991

28. L. Wang, S. Feigenberg, L. Chen, K. Paskalev, **L. Jin**, C. M Ma, How to account for patient-specific tumor motion in target definition for lung cancer treatment planning: dosimetric comparison of a multi-phase ct simulation approach and MRI cine study, Med. Phys. (2006) **33**, p2037

29. L. Wang, S. Feigenberg, L. Chen, K. Paskalev, **L. Jin** and C. M. Ma, On accounting for patient-specific tumor motion in target definition for lung cancer treatment planning: comparison of a multi-phase Ct simulation approach and MRI cine study, International Journal of Radiation Oncology Biology Physics, (2006) **66**, pS612-pS613

Conference Papers (selected)

1. J. Shi, **L.Jin**, and G. H. Hoffstaetter, Study of beam-beam effects in HERA with self-consistent beam-beam simulation, in Proceedings of the 2003 IEEE Particle Accelerator Conference, edited by J. Chew, P. Lucas and S. Webber (IEEE, New York, 2003), p. 369.

2. **L. Jin** and J. Shi, Study of the wire compensation of long-range beam-beam interactions in LHC with a strong-strong beam-beam simulation, in Proceedings of EPAC 2002, Paris, France. p.1299

3. J. Shi, O. Kheawpum, and **L. Jin**, “Global compensation of long-range beam-beam interactions with multipole corrections”, in Proceedings of EPAC 2002, Paris, France. p.1296

4. F. Schmidt, A. Verdier, ***L. Jin*** and D. Kaltchev, Correction of the system b3 error with the resonance-free lattice in the LHC”, in Proceedings of EPAC 2000, Vienna, Austria. p. 1561

5. N. Huang, **L. Jin**, et al, Lattice design of BTCF storage ring, Proc. of PAC97, Vancouver, B.C., Canada, May 12-16, 1997

6. L. Jin, BEPC response matrix measurement and analysis, the 6th Chinese Accelerator Physics Society Symposium, Zhang Jia Jie, China, 1997

7. **L. Jin**, N. Huang, J. Wang, et al, Lattice study on Beijing Tau-Charm factory storage ring, the 6th China-Japan Joint Symposium, Chen Du, China, 1996

8. N. Huang, **L. Jin**, D. Wang, Y. Z. Wu and G. Xu, Preliminary lattice design of beijing Tau-charm factory storage ring, Proc. of PAC95, Dallas, USA 1995

9. N. Huang, **L. Jin**, D. Wang, L. Wang, A. Xiao and G. Xu, Lattice design of Beijing light source, Proc. of PAC95, Dallas, USA, 1995

10. Y. Z. Wu, N. Huang, **L. Jin** and D. Wang, Beijing Tau-Charm factory storage ring design study, Proceedings of Workshop on the Tau-Charm Factory, Argonne National Lab, June 1995, AIP 349

11. Z. Y. Guo, X. L. Zhang, **L. Jin,** et al, Study on accelerator physics and luminosity upgrades”, The 5th Japan-China Joint Symposium, Japan, October 1993

12. L. M. Chen, Z. Y. Guo, N. Huang, **L. Jin**, et al, Luminosity and beam-beam effects in BEPC, XVth International Conference on High Energy Accelerators. Hamburg Germany, July 1992

Reports

1. J. Fan**, L. Jin**, A. Eldeeb, Q. Xu, A. Tafo and C. Ma, Radiation measurements surrounding the Primus linear accelerator (P2) at Fox Chase Cancer Center, Physics Report, Nov. 2007

2. L. Wang, J. Fan and **L. Jin**, Commissioning and Beam Comparison for High Dose Rate 6 MV Beam used for Stereotactic Radiosurgery on the Trilogy, Report: FCCC-RADPHYS-0701, 2007

3. L. Wang, J. Fan, W. Luo, T. Lin and **L. Jin**, Commissioning and Beam Comparison for Varian Trilogy Linear Accelerator**,** Physics Report, Step. 2006

4. C.M. Ma, L. Wang, J. Fan, W. Luo, T. Lin, **L. Jin** and A. ElDeeb, Exposure measurement surrouding the 10 MV Varian Trilogy Accelerator (T3) at Fox Chase Cancer Center, Report: FCCC-RADPHYS-0602, 2006

5. C.M. Ma, L. Wang, R.A. Price, J. Fan, J. Chen, S. Stathakis, W. Luo and **L. Jin**, Radiation Measurements Surrounding the Primus Linear Accelerator (P3) at Fox Chase Cancer Center", Report: FCCC-RADPHYS-0601, 2006

6. **L. Jin**, D. Kaltchev, F. Schmidt and A. Verdier, Correction of the system b3 error with the resonance-free lattice in the LHC, CERN-LHC-Project-Report-401, Aug 2000

7. **L. Jin** and F. Schmidt, Tune scan studies for the LHC at injection energy, CERN-LHC-Project-Report-377, May 2000

8. **L. Jin**, Y. Papaphilippou and F. Schmidt, Improvement of LHC dynamic aperture via octupole spool pieces for the nominal tunes, CERN-LHC-Project-Report 253, 1998

9. **L. Jin,** Analysis of beam energy and RF frequency through orbit data in ATF DR, ATF Internal Report, ATF-97-24, 1997

Talks & Seminars (selected)

1. Potential dosimetric benefits of modulated electron radiation therapy, Great Wall 2008 Congress on Medical Physics & 14th Annual Meeting of CSMP, Beijing China, November 23 - 26 2008

2. Modulated electron radiation therapy: treatment planning, delivery and dosimetric verification, Symposium of Hebei Forth Radiation Therapy, Baoding, Heibei China, December 29 – 30, 2008

3. Optimal beam margin for lung cancer SBRT, Fox Chase Cancer Center, May 2007

4. Dosimetric verification of MERT delivery using a photon MLC, Fox Chase Cancer Center, March 2007

5. Characteristics of electron beams collimated by an electron multileaf collimator, Minneapolis, AAPM 2007 Annual meeting

6. Evaluation of dose calculation of SRT/IMRT for small lung lesions using Monte Carlo simulations, Orlando, AAPM 2006 Annual meeting

7. Monte Carlo dosimetry of lung cancer SBRT, Fox Chase Cancer Center, May 2006

8. Study of coherent beam-beam tune shift in very un-symmetrical case of beam-beam interactions, the APR04 meeting of the American Physical Society, May 2004

9. Chaotic coherent beam-beam instability in strong-weak case of beam-beam Interactions, the APR04 meeting of the American Physical Society, May 2004

10. Coherent beam-beam effects in storage-ring colliders, Fermilab, Sept. 2004

11. Tune scan studies for the LHC at injection energy, CERN, Geneva, Switzerland, Nov. 1998

    Analysis of beam energy and RF frequency through orbit data in ATF DR, KEK, Tsukuba, Japan, Nov. 1997