

**University of Pittsburgh**  
**School of Medicine**

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**EDUCATION**

- **M.Sc., Physics**, Technical University of Lodz, Lodz, Poland, 1983
- **Ph.D., Physics**, Dalhousie University, Halifax, Nova Scotia, Canada, 1992

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**POSTGRADUATE TRAINING AND FELLOWSHIP APPOINTMENTS**

7/83 - 8/87	Research Assistant, Department of Physics, Technical University of Lodz, Lodz, Poland.
10/92 - 8/93	Post-doctoral Fellow, Department of Chemistry, Dalhousie University, Halifax, Canada.
9/93 - 11/94	Research Associate, Department of Radiological Sciences Division of Physics and Engineering, University of California, Irvine, California.
11/94 - 10/96	Medical Physics Resident, Department of Radiation Oncology, University of California, San Francisco, California.

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**FACULTY APPOINTMENTS AND POSITIONS HELD**

2/2008 – present: Clinical Associate Professor and Associate Director, Medical Physics Division, University of Pittsburgh Medical Center Cancer Centers, Pittsburgh, Pennsylvania.

Administrative, managerial and clinical duties related to dealing with all aspects of radiation therapy physics program for the nineteen Cancer Centers of UPMC;

8/00 – 1/08: Assistant Professor, Department of Radiation Oncology, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania.

Faculty appointment related duties, including teaching, research and support for medical physics programs at several locations within Jefferson Health System, including:

- Bodine Cancer Center, TJUH;
- Jefferson Hospital for Neuroscience;
- Jefferson Radiation Oncology Center at Riddle Memorial Hospital.

11/96 - 7/00 Instructor, Department of Radiation Oncology, Thomas Jefferson University Hospital, Philadelphia, Pennsylvania.

Faculty appointment related duties, including teaching, research and support for medical physics programs at several locations within Jefferson Health System.

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## **CERTIFICATION**

American Board of Radiology, Therapeutic Radiological Physics, 1999

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## **HONORS AND AWARDS**

Izaak Walton Killam Memorial Scholarship (Canada) (1989-1991)  
William Leiper Memorial Scholarship (Canada) (1990-1991)  
Star Employee, Thomas Jefferson Univ. Hospital (2005, 2006)

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## **PROFESSIONAL SOCIETY MEMBERSHIP**

National Societies:

American Association of Physicists in Medicine (AAPM) (1997- present)  
American Society for Therapeutic Radiology and Oncology (2003- present)

Local Societies:

Delaware Valley Chapter of AAPM (1997-2007)  
Penn-Ohio Valley Chapter of AAPM (2008- present)  
President-Elect, Penn-Ohio Valley Chapter of AAPM (2009)  
President, Penn-Ohio Valley Chapter of AAPM (2010)  
Past-President, Penn-Ohio Valley Chapter of AAPM (2011)

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## **PROFESSIONAL AND SCIENTIFIC COMMITTEES**

Member: Exchange Scientist Program Subcommittee of International Affairs Committee - American Association of Physicists in Medicine (2005-2009)  
Member: AAPM Working Group on Dosimetry Calibration Protocol for Beams that are Not Compliant with TG-51 (2007 - present)  
Member: AAPM Task Group 178 on Gamma Stereotactic Radiosurgery Dosimetry and Quality Assurance (2009 - present)

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## **REVIEWER SERVICES**

- \* International Journal of Radiation Oncology, Biology, Physics
  - \* Medical Physics
  - \* Radiotherapy and Oncology
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## **MAJOR TEACHING AND CLINICAL RESPONSIBILITIES**

- \* Teaching radiological physics to radiation oncology residents and medical physics residents
  - \* Mentoring medical physics residents
  - \* Developing, updating and enforcing clinical radiation therapy physics policies and procedures,
  - \* Keeping track of technical advances and making recommendations for equipment upgrades and purchases,
  - \* Insuring communication among all staff and resolving operational and logistic issues, managing physics/dosimetry staff,
  - \* Physics staff recruitment.
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## RESEARCH INTERESTS

- \* Image-guided stereotactic radiation therapy
  - \* Intensity modulated radiation therapy
  - \* Dose calculation and optimization of dose delivery
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## CLINICAL PROTOCOLS

Department of Radiation Oncology, TJUH, "A Randomized Trial Comparing Two Forms of Immobilization of the Head for Fractionated Stereotactic Radiotherapy", P.I.  
Supported by \$10,000 corporate grant.

Department of Radiation Oncology, TJUH, "Exploratory Study of the Efficacy of Cone-Beam Computed Tomography (CBCT) Scanning During Radiation Therapy for Tumors of the head and/or neck", Co-P.I.

Departments of Radiation Oncology and Neurosurgery, TJUH, "Phase II trial assessing the clinical effectiveness of intensity-modulated stereotactic radiosurgery (IMRS) for the management of pain in patients with spinal axis metastatic neoplasms", Co-P.I.  
Supported by \$30,000 corporate grant.

University of Pittsburgh Cancer Institute, "UPCI 10-003: An Outcome Analysis for Stereotactic Body Radiation Therapy (SBRT) Treatment of Non-Small Lung Cancer Patients Using 4D PET/CT with Real-Time Position Management (RPM™) System and a Concomitant Evaluation of the Impact and Performance Characteristics of the Immobilization System", Co-P.I.  
Supported by \$750,000 corporate grant.

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## INVITED LECTURES

1. G. Bednarz, "Stereotactic Radiosurgery" presented at 11<sup>th</sup> Annual Dosimetry/Physics Symposium, organized by Drexel University College of Medicine and the Department of Radiation Oncology, Hahnemann University Hospital, Philadelphia, PA, March 13-16, 2003.
2. G. Bednarz, "Stereotactic Radiosurgery" presented at 12<sup>th</sup> Annual Dosimetry/Physics Symposium, organized by Drexel University College of Medicine and the Department of Radiation Oncology, Hahnemann University Hospital, Philadelphia, PA, March 4-7, 2004.
3. G. Bednarz, "Linac Based Radiosurgery" presented at 2<sup>nd</sup> Symposium on Technical and Clinical Advances in Radiation Oncology, UPMC Cancer Centers, Pittsburgh, PA, Sep. 13<sup>th</sup>, 2008.
4. G. Bednarz, "Trilogy-Based Stereotactic Radiosurgery: Principles of Technology and Quality Assurance" presented at 3<sup>rd</sup> Symposium on Technical and Clinical Advances in Radiation Oncology, UPMC Cancer Centers, Pittsburgh, PA, Nov. 14<sup>th</sup>, 2009.
5. G. Bednarz, "Stereotactic Radiosurgery: Existing and Emerging Technologies" presented at 4<sup>th</sup> Symposium on Technical and Clinical Advances in Radiation Oncology, UPMC Cancer Centers, Pittsburgh, PA, Nov. 6<sup>th</sup>, 2010.
6. G. Bednarz, "Treatment planning for modern Gamma Knives: 4C and Perfection" presented at 5<sup>th</sup> Symposium on Technical and Clinical Advances in Radiation Oncology, UPMC CancerCenter, Pittsburgh, PA, April 28<sup>th</sup>, 2012.

7. G. Bednarz, "ACRO accreditation: site physicist perspective", presented at AAPM Radiation Oncology Program Accreditation Symposium, Denver, CO, March 14<sup>th</sup>, 2014.
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## BIBLIOGRAPHY

### Publications in peer-reviewed journals

1. A. Xu, J. Bhatnagar, G. Bednarz, J. Novotny, J. Flickinger, L. D. Lunsford, M. Saiful Huq, "Two year experience with the commercial Gamma Knife Check software", accepted for publication in J. of Appl. Clinical Med. Phys., 2016.
2. A. Xu, J. Bhatnagar, G. Bednarz, A. Niranjana, J. Flickinger, L. D. Lunsford, M. Saiful Huq, "Dose differences between the three dose calculation algorithms in Leksell Gamma Plan", J. of Appl. Clinical Med. Phys., 15(5), 89-99 (2014).
3. D. Michalski, M. Saiful Huq, G. Bednarz, and D. E. Heron, "The use of strain tensor to estimate thoracic tumors deformation", Med. Phys., 41(7), 073503-1, 073503-6 (2014).
4. R. Dickson, J. O. Kim, M. Saiful Huq, G. Bednarz, J. Suyama, D. M. Yealy, M. Izadbakhsh, and J. S. Greenberger, "Interceptor and Phantom Trials of EDNS at UPMC", Health Phys., 105(5 Suppl 3):S199-208 (2013).
5. Y. Cui, J. Galvin, W. Parker, S. Breen, F.-F. Yin, J. Cai, L.S. Papiez, X. A. Li, G. Bednarz, W. Chen, and Ying Xiao, "Implementation of Remote 3-Dimensional Image Guided Radiation Therapy Quality Assurance for Radiation Therapy Oncology Group Clinical Trials", Int. J. Radiat. Oncol. Biol. Phys., 85(1), 271-277 (2013).
6. A. C. Olson, R. E. Wegner, C. Scicutella, D. E. Heron, J. S. Greenberger, M. Saiful Huq, G. Bednarz, J. C. Flickinger, "Quality Assurance Analysis of a Large Multicenter Practice: Does Increased Complexity of Intensity Modulated Radiotherapy Lead to Increased Error Frequency?" Int. J. Radiat. Oncol. Biol. Phys., 82(1), e77- e82 (2012).
7. J. O. Kim, M. Saiful Huq, J. Novotny Jr., G. Bednarz, R. Palatine, M. Reilly, P. Paris, J. S. Greenberger, "Performance Characteristics of a Novel Isotope Detection and Notification System Designed for Use in Hospitals", Operational Rad. Safety, Vol. 100, Suppl. 2 S71-S78 (2011).
8. K. Podder, G. Bednarz, Y. Yu, and J. M. Galvin, "Physical characterization and comparison of two commercially available micro-MLCs", Physica Medica (European Journal of Medical Physics), 27(1), 52-57 (2011).
9. J. Novotny Jr., J. P. Bhatnagar, H.-T. Chung, G. Bednarz, L. Ma, J. Johansson, S. M. Huq, "Assessment of variation in Elekta<sup>®</sup> plastic spherical- calibration phantoms and its impact on the Leksell Gamma Knife<sup>®</sup> calibration", Med. Phys., 37(9), 5066-5071 (2010).
10. R. B. Den, A. Doemer, G. Kubicek, G. Bednarz, J. Galvin, W. Keane, Y. Xiao, and M. Machtay, "Daily image guidance with cone-beam computed tomography for head-and-neck cancer intensity-modulated radiotherapy: a prospective study", Int. J. Radiat. Oncol. Biol. Phys., 76(5), 1353-1359 (2009).

11. D.W. Andrews, M. Werner-Wasik, R.B. Den, S.H. Peak, B. Downes-Philips, T.O. Willcox, G. Bednarz, M. Maltenfort, J.J. Evans, and W. J. Curran, Jr. "Toward dose optimization for fractionated stereotactic radiotherapy for acoustic neuromas: comparison of two dose cohorts", *Int. J. Radiat. Oncol. Biol. Phys.*, 74(2), 419-426 (2009).
12. J. Novotny Jr., J. P. Bhatnagar, M. A. Quader, G. Bednarz, D.L. Lunsford, M.S. Huq, "Measurement of relative output factors for the 8 and 4 mm collimators of Leksell Gamma Knife Perfexion by film dosimetry", *Med. Phys.*, 36(5), 1768-1774 (2009).
13. J. P. Bhatnagar, J. Novotny Jr., M. A. Quader, G. Bednarz, M.S. Huq, "Unintended attenuation in the Leksell Gamma Knife Perfexion calibration phantom adapter and its effect on dose calibration", *Med. Phys.*, 36(4), 1208-1211 (2009).
14. G. Bednarz, M. Machtay, M. Werner-Wasik, B. Downes, J. Bogner, W. Curran, A. Dicker, R. Valicenti, J. Evans, D. Andrews, "Interim report of a randomized trial comparing two forms of immobilization of the head for fractionated stereotactic radiotherapy", *Med. Phys.*, 36(1), 12-17 (2009).
15. J. Novotny, Jr., J. P. Bhatnagar, A. Niranjana, M.A. Quader, M. S. Huq, G. Bednarz, J. C. Flickinger, D. Kondziolka, L.D. Lunsford, "Dosimetric comparison of the Leksell Gamma Knife Perfexion and 4C", *J. Neurosurg, Suppl.*, 109, 8-14( 2008).
16. J.M. Galvin and G. Bednarz, "Quality assurance procedures for Stereotactic Body Radiation Therapy", *Int. J. Radiat. Oncol. Biol. Phys.*, 71(1), S121-S125 (2008).
17. D.W. Andrews, G. Bednarz, J.J. Evans, M.B. Downes, "A review of 3 current radiosurgery systems", *Surgical Neurology*, 66, 559-564 (2006).
18. F. Henson, H.W. Goldman, R.H. Rosenwasser, M.B. Downes, G. Bednarz, E.C. Pequignot, M. Werner-Wasik, W. Curran, Jr., and D.W. Andrews, "Glycerol rhizotomy versus gamma knife radiosurgery for the treatment of trigeminal neuralgia: an analysis of patients treated at one institution", *Int. J. Radiat. Oncol. Biol. Phys.*, 63, 82-90 (2005).
19. S. Paek, B. Downes, G. Bednarz, W.M. Keane, M. Werner-Wasik, W. Curran, Jr., and D.W. Andrews, "Integration of surgery with fractionated stereotactic radiotherapy for treatment of nonfunctioning pituitary macroadenomas", *Int. J. Radiat. Oncol. Biol. Phys.*, 61, 795-808 (2005).
20. Y. Xiao, M. Werner-Wasik, D. Michalski, C. Houser, G. Bednarz, W. Curran, Jr., and J. Galvin "Comparison of three IMRT inverse planning techniques that allow partial esophagus sparing in patients receiving thoracic radiation therapy for lung cancer", *Medical Dosimetry*, 29, 210-216 (2004).
21. A.N. Solan, M.J. Solan, G. Bednarz, and M.B. Goodkin, "Management of patients with cardiac pacemakers and implantable cardioverter-defibrillators during radiation therapy", *Int. J. Radiat. Oncol. Biol. Phys.*, 59, 897-904 (2004).
22. G. Bednarz, D. Michalski, P.R. Anne, and R.K. Valicenti, "Inverse treatment planning using objective functions with variable component priority", *Phys. Med. Biol.*, 49, 2503-2514 (2004).
23. G. Bednarz, M. S. Huq, and U.F. Rosenow, "Deconvolution of detector size effect for output factor measurement for narrow Gamma Knife radiosurgery beams", *Phys. Med. Biol.*, 47, 3643-3649 (2002).
24. G. Bednarz, D. Michalski, C. Houser, M. S. Huq, Y. Xiao, P. R. Anne, and J. M. Galvin, "The use of mixed-integer programming for inverse treatment planning with pre-defined field segments", *Phys. Med. Biol.*, 47, 2235-2245 (2002).
25. D.W. Andrews, O. Suarez, H.W. Goldman, B. Downes, G. Bednarz, B. W. Corn, M. Werner-Wasik, J. Rosenstock,

- and W. Curan, Jr., "Stereotactic radiosurgery and fractionated stereotactic radiotherapy for the treatment of acoustic schwannomas: comparative observations of 125 patients treated in one institution", *Int. J. Radiat. Oncol. Biol. Phys.*, 50, 1265-1278 (2001).
26. G. Bednarz, B. Downes, M. Werner-Wasik, and R.H. Rosenwasser, "Combining stereotactic angiography and 3D time-of-flight magnetic resonance angiography in treatment planning for arteriovenous malformation radiosurgery", *Int. J. Radiat. Oncol. Biol. Phys.*, 46, 1149-1154 (2000).
  27. G. Bednarz, B. Downes, B. Corn, W. Curran, and H.W. Goldman, "Evaluation of the spatial accuracy of MRI-based stereotactic target localization for Gamma Knife radiosurgery of functional disorders", *Neurosurg.*, 45, 1156-1163 (1999).
  28. S. Molloy, G. Bednarz, J. Tang, Y. Zhou, and T. Mathur, "Absolute volumetric coronary blood flow measurement with digital subtraction angiography", *Int. J. Cardiac Imag.* 14, 137-145 (1998).
  29. G. Bednarz, D. Geldart, C. Glorieux, J. Thoen, and M.A. White, "Photoacoustic investigation of the temperature and magnetic field dependence of the specific heat and thermal conductivity near the Curie point in Gadolinium", *Phys. Rev. B* 52, 12770-12770 (1995).
  30. G. Bednarz, M.A. White, M.R. Pressprich, and R. Willett, "Thermal and diffraction studies of phase transitions in the incommensurate compound  $[P(CH_3)_4]_2CuCl_2$ ", *Phys. Rev. B* 49, 832-837 (1994).
  31. G. Bednarz, D.J.W. Geldart, and M.A. White, "Heat capacity of gadolinium near the Curie temperature", *Phys. Rev. B* 47, 14247-14259 (1993).
  30. G. Bednarz and D.J.W. Geldart, "Demagnetization heat capacity of uniaxial ferromagnets near critical point", *J. Phys.: Condens. Matter* 5, L239-L244 (1993).
  32. G. Bednarz, B. Millier, and M.A. White, "High-resolution, high-sensitivity AC calorimeter", *Rev. Sci. Instrum.* 63(8), 3944-3952 (1992).
  33. G. Bednarz, G. Stroink, and M.A. White, "A study of the heat capacity of the superconductor  $EuBa_2Cu_3O_{7-x}$ ", *Physical C* 165, 385-390 (1990).
  34. B. Wojciechowski, I. Owczarek, and G. Bednarz, "Freezing of aqueous solutions containing gases", *Cryst. Res. Technol.* 23(7), 843-848 (1988).
  34. G. Bednarz and M. Krasinski, "Visualization of the boundary layer on the growing ice", *Cryst. Res. Technol.* 22(9), K145-K147 (1987).
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### Proffered book chapters

1. B. Jeremic, M. Werner-Wasik, S. Villa, F. Paulsen, G. Bednarz and M. Buchgeister, "Stereotactic Radiation Therapy in Primary Optic Sheath Meningioma" in *Primary Optic Nerve Meningioma*. B. Jeremic and S. Pitz, eds., part of *Medical Radiology Radiation Oncology series*, Springer, Berlin, 105(2008).
  2. D.W. Andrews, G. Bednarz, B. Downes, and M. Werner-Wasik, "Fractionated Stereotactic Radiotherapy: Rationale, Indications, and Treatment Technique", in *Principles and Practice of Stereotactic Radiosurgery*, L. Chin and W.F. Regine, eds., Springer, New York (2008).
  3. J.M. Galvin, R. Croce, G. Bednarz, "Advanced forward planning techniques" in *General practice of radiation oncology physics in the 21<sup>st</sup> century*. Monograph No. 26. A.S. Shiu, D.E. Mellenberg, eds., Medical Physics Publishing, 73-100 (2000).
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### Abstracts/Conference Presentations

1. Y. Cui, J.M. Galvin, W. Parker, S.L. Breen, F. Yin, L.S. Papiez, A. Li, G. Bednarz, W. Chen, Y. Xiao, "Process and initial experience of remote credentialing of 3D IGRT data for institutions participating in RTOG clinical trials", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 81(2), 810(2011).
2. G. Kubicek, M. Huq, G. Bednarz, R. Lansberry, D. Michalski, D. Heron, "Intensity-Modulated Radiation Therapy (IMRT) versus RapidArc (RA) in the definitive treatment of head and neck cancer", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 81(2), 898(2011).
3. D. Michalski, G. Bednarz, M. Huq, D. Heron, "Tensor-based measure of tumor deformation", *Med. Phys.* 38(6), 3449(2011).
4. X. Li, Y. Yang, T. Li, S. Burton, G. Bednarz, D. Heron, and M. Huq, "Intensity-Modulated Arc Therapy for Stereotactic Radiotherapy of Spinal and Paraspinal Tumors", *Med. Phys.* 37(6), 3311(2010).
5. M. Huq, J. Kim, J. Novotny, G. Bednarz, R. Palatine, M. Reilly, P. Paris, and J. Greenberger "Acceptance and Commissioning of a Novel Ionizing Radiation Emitting Isotope Hospital Detection and Notification System Suitable for Use in Radiation Counter-Terrorism", *Med. Phys.* 36(6), 2448(2009).
6. Y. Mutaf, C. Scicutella, D. Michalski, E. Brandner, K. Fallon, G. Bednarz, and M. Huq, "Is respiratory gating more prone to dosimetric errors due to irregular respiratory motion?", *Med. Phys.* 36(6), 2735(2009).
7. J. Novotny, M. Desrosiers, M. Huq, G. Bednarz, J. Puhl, and S. Seltzer, "Alanine as a small field dosimeter- first tests in Gamma Knife radiosurgery fields", *Med. Phys.* 36(6), 2612(2009).
8. A. Harrison, G. Bednarz, James M. Galvin, "Evaluation of the accuracy of cone-beam based patient positioning for treatment of spinal lesions and efficacy of adaptive strategies to maximize the cord sparing", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 69(3), 691(2007).
9. T. Podder, G. Bednarz, V. Mistic, Y. Yu, J. Galvin, "Penumbra evaluation of the Synergy-S and Novalis micro-MLCs", *Med. Phys.* 34(6), 2489(2007).
10. A. Harrison, V. Mistic, T. Podder, G. Bednarz, G. Cryan, K. Fallon, C. Houser, Y. Yu Y. Xiao, "Special dosimetric/measurement considerations in commissioning a novel integrated miniMLC linear accelerator", *Med. Phys.* 34(6), 2489(2007).
11. J. Bogner, G. Bednarz, B. Downes, J. Galvin, D. Georg, D. Andrews, W. Curran, "On the accuracy of cone-beam CT and stereoscopic x-ray image guidance for radiotherapy of vertebral tumors: An intra-institutional comparison", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 66(3), 639 (2006).
12. G. Bednarz, et al., "Interim report of a randomized trial comparing two forms of immobilization of the head for fractionated stereotactic radiotherapy", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 66(3), 715 (2006).
13. G. Bednarz, A.O. Nawaz, D. Xu, and J. Galvin, "Quality assurance procedure for a kV cone-beam device", *Med. Phys.* 33(6), 2268(2006).
14. A.O. Nawaz, C. Houser, G. Bednarz, A. Dicker, and J. Galvin, "A phantom study to compare 2D electronic portal imaging with 3D kV cone-beam imaging", *Med. Phys.* 33(6), 2022(2006).

15. D. Michalski and G. Bednarz, "Computational study of the rigid body image registration accuracy", *Med. Phys.* 32(6), 2042 (2005).
16. K. Fallon, G. Bednarz, and J. Galvin "The dosimetric characterization of the performance of the One Dose MOSFET dosimeter in the buildup region of a 6 MV photon beam", *Med. Phys.* 32(6), 2008 (2005).
17. G. Bednarz, D. Michalski, A. Dicker, and D.W. Andrews "Image registration technique based on point landmarks and voxel similarity measures for Gamma Knife radiosurgery treatment planning", *Med. Phys.* 31(6), 1825 (2004).
18. M. S. Huq, G. Bednarz, B. Downes, and P. Andreo, "Application of the AAPM TG-51 and TG-21 protocols and the IAEA TRS-398 Code of Practice for the calibration of linac based radiosurgery beams", *Med. Phys.*, 30(6), 1449 (2003).
19. Y. Xiao, M. Werener-Wasik, D. Michalski, C. Houser, G. Bednarz, W. Curran, Jr., and J. Galvin, "Comparison of three IMRT inverse planning techniques that allow partial esophagus sparing in patients receiving thoracic radiation therapy for lung cancer", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 54(2), 153 (2002).
20. D. Michalski, G. Bednarz, M. Werner-Wasik, R. Rosenwasser, and W. Curran, Jr. "Transformation of shot coordinates for repeated application of Leksell head frame for volume staged treatment of large arteriovenous malformations" *Med. Phys.*, 29(6), 1369 (2002).
21. G. Bednarz and D. Michalski, "Inverse treatment planning using objective functions with variable component priority", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 54(2), 155 (2002).
22. G. Bednarz, C. Houser, D. Michalski, D. Butzbach, M. Werner-Wasik, J. Galvin, and W. Curran, Jr., "Using segmented fields to treat brain tumors" *Med. Phys.*, 29(6), 1209 (2002).
23. G. Bednarz, M. S. Huq, and U.F. Rosenow, "Measurement of output factors for Gamma Knife radiosurgery beams with a miniature diamond detector, using deconvolution to correct for detector size effect", *Med. Phys.*, 28(6), 1303 (2001).
24. G. Bednarz, D. Michalski, C. Houser, M. S. Huq, Y. Xiao, P. R. Anne, J. M. Galvin, and W.J. Curran, "The use of mixed-integer programming for inverse treatment planning with pre-defined field segments", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 51(4), 403 (2001).
25. C.T. Chen, D.H. Heron, S. Henderson, M.B. Downes, G. Bednarz, M. Werner-Wasik, D.W. Andrews, and W.J. Curran, "Conventionally fractionated stereotactic radiotherapy for the treatment of craniopharyngioma", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 51(3), 250 (2001).
26. J. Galvin, Y. Xiao, D. Michalski, Y. Censor, C. Houser, G. Bednarz, P.R. Anne, S. Huq, and W.J. Curran, "Treating oropharyngeal cancer with an inverse planning method that starts from the definition of field segments", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 51(3), 76 (2001).
27. J. Galvin, Y. Xiao, D. Michalski, Y. Censor, C. Houser, and G. Bednarz, "Segmental inverse planning that starts with a definition of allowable fields", *Med. Phys.*, 28(6), 1253 (2001).
28. D. Michalski, Y. Xiao, Y. Censor, J. Galvin, and G. Bednarz, "Improvement of the conventional treatment plan via automation of the process", *Med. Phys.*, 28(6), 1196 (2001).
29. G. Bednarz, "Deconvolution of detector size effect for output factor measurement for narrow Gamma Knife radiosurgery beams", *Med. Phys.*, 27(6), 1411 (2000).
30. M. Hossain, G. Bednarz, Y. Xiao, and J.M. Galvin, "Calculating combined dose distributions and dose-volume histograms for sequential and concurrent boosts when inverse planning is used for IMRT", *Med. Phys.*, 27(6), 1443 (2000).
31. Y. Xiao, G. Bednarz, and J.M. Galvin, "A sequential optimization technique for forward treatment planning", *Med.*



- Phys., 27(6), 1413 (2000).
32. J. M. Galvin, G. Bednarz, L. Lin, B. Lally, and L. Komarnicky, "Using segmented fields to treat the breast", *Med. Phys.*, 27(6), 1388 (2000).
  33. S.J. Dziuba, W.J. Curran, O. Suarez, H.W. Goldman, B. Downes, G. Bednarz, M. Werner-Wasik, and D.W. Andrews, "Single institution experience with 110 patients treated for acoustic schwannomas. Analysis of Gamma Knife stereotactic radiosurgery and Linac fractionated stereotactic radiotherapy", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 48(3), 254 (2000).
  34. S. Hughes, G. Bednarz, S.M. Gollomp, W. Curran, Jr., and H.W. Goldman, "Functional outcome after radiosurgery for movement disorder", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 45(3), 172 (1999).
  35. G. Bednarz, M.S. Huq, J.W. Sweet, S. Hughes, P.R. Anne, and J.M. Galvin, "Forward versus inverse treatment planning for head and neck tumors that surround normal structures", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 45(3), 421 (1999).
  36. M.S. Huq, G. Bednarz, M. Hossain, J.M. Galvin, and W. Curran, Jr., "Verification of field placement for rotational IMRT", *Med. Phys.*, 26(6), 1136 (1999).
  37. G. Bednarz, B. Downes, M. Werner-Wasik, and R.H. Rosenwasser, "Combining stereotactic angiography and 3D time-of-flight magnetic resonance angiography in treatment planning for arteriovenous malformation radiosurgery", *Neurosurg.*, 43(3), 693 (1998).
  38. J. Galvin, J. Sweet, G. Bednarz, S. Hughes, M. Werner-Wasik, B. Corn, and W. Curran, "A comparison of standard and inverse treatment planning for non-coplanar field arrangements", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 42(1), 208 (1998).
  39. G. Bednarz, B. Downes, M. Werner-Wasik, and R.H. Rosenwasser, "Combining stereotactic angiography and 3D time-of-flight magnetic resonance angiography in treatment planning for arteriovenous malformation radiosurgery", *Int. J. Radiation Oncol. Biol. Phys., Suppl.*, 42(1), 363 (1998).
  40. J. Galvin, J. Sweet, G. Bednarz, S. Hughes, and W. Curran, "Optimizing 3D dose distribution without inverse treatment planning", *Med. Phys.*, 25(7), A207 (1998).
  41. I. Khalil-Bustany, I. Daftari, G. Bednarz, and L. Verhey, "Dose rate optimization for dynamic one-dimensional beam intensity modulation", *Med. Phys.*, 25(7), A205 (1998).
  42. G. Bednarz, B. Downes, A. Aita, and H.W. Goldman, "Spatial accuracy of MRI-based stereotactic target localization for radiosurgical and open-radiofrequency procedures for functional disorders", *J. Neurosurg.*, 88(2), 363 (1998).
  43. G. Bednarz, N. Yue, F. Waterman, B. Corn, and A. Dicker, "Does the urethral angle changes with leg position? Implications for urethral-based CT-planned transperineal prostate implants", *Int. J. Radiat. Oncol. Biol. Phys., Suppl.*, 39, 348 (1997).
  44. G. Bednarz, B. Downes, B. Corn, W. Curran, and H.W. Goldman, "Evaluation of the spatial accuracy of MRI-based stereotactic target localization for Gamma Knife radiosurgery of functional disorders", *Med. Phys.*, 24, 1043 (1997).
  45. G. Bednarz, N. Albright, and K. Weaver, "Evaluation of a 3D convolution based treatment planning system", *Med. Phys.*, 23, 1173 (1996).
  46. S. Molloi, G. Bednarz, and J. Tang, "Absolute coronary artery blood flow measurement using digital subtraction angiography", *Med. Phys.*, 22, 1534 (1995).
  47. S. Molloi, G. Bednarz, and J. Hicks, "Volumetric coronary blood flow measurement using dual-energy DSA", *Med. Phys.*, 21, 941 (1994).
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