

CURRICULUM VITAE

E. ISHMAEL PARSAI, Ph.D., FACRO, FAAPM, FIOMP

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MS 1151, 3000 Arlington Ave., Toledo, Ohio 43615

EDUCATION:

University of Toledo Health Science Campus (previously known as Medical University of Ohio, and also Medical College of Ohio), Toledo, Ohio.

Ph. D. in Medical Sciences (Concentration in Radiation Oncology Physics)
(GPA=3.96/4.0) 8/1995

University of Missouri, Columbia (UMC), &
Missouri University Research Reactor (MURR)
Completed requirements (all but dissertation) **towards Ph.D. in Nuclear Physics.** 5/85 to 8/88

University of Missouri, Columbia, Missouri.
Master of Science in Medical Physics, (GPA=3.9/4.0) 5/85

University of Missouri-Kansas City, Kansas City, Mo. 5/83
Master of Science in Nuclear Physics, (GPA=3.9/4.0)

Kansas State University, Manhattan, Kansas. 12/80
B.S. in Electrical Engineering, (GPA=3.5/4.0)

EMPLOYMENT:

**Director of Graduate Medical Physics Program and
Chief of Medical Physics Division** 4/2000 to Present
University of Toledo Health Science Campus (UT-HSC)
Department of Radiation Oncology

Interim Radiation Safety Officer and Certified Radiation Expert 7/2012 to 1/2015
University of Toledo

Chief Clinical Medical Physicist 9/93 to 4/2000
UT-HSC, Department of Radiation Oncology

Director of Medical Physics Department 4/90 to 9/93
Mercy Health Center
4300 West Memorial Road
Oklahoma City, Oklahoma 73120

Director of Medical Physics Department St. Francis Regional Medical Center (SFRMC) 929 N. St. Francis, Wichita, Kansas 67214	12/88 to 4/90
Medical Physicist, (SFRMC) Radiation Therapy Department	5/88 to 12/88
Consultant Medical Physicist Midwest Radiation Consultants Wichita, Kansas	7/88 to 4/90

FACULTY APPOINTMENTS:

Professor of Radiation Oncology & Director of UT Graduate Medical Physics Programs University of Toledo	6/2008 to present
Adjunct Professor of Radiation Oncology First Affiliated Hospital of Wenzhou Medical University Wenzhou, PR of China	5/2014 to present
Professor of Radiation Oncology & Director of Radiation Oncology Medical Physics Division Department of Radiation Oncology University of Toledo Health Science Campus	11/2006 to present
Associate Professor & Director of Medical Physics Division Department of Radiation Oncology University of Toledo Health Science Campus, (OKA) Medical College of Ohio	8/2000 to 11/2006
Assistant Professor and Clinical Medical Physicist Department of Radiation Oncology (MCO)	11/95 to 8/2000
Adjunct Professor of Physics and Astronomy, UT Department of Physics & Astronomy	1/2000 to Present
Adjunct Associate Professor, Wayne State University, Detroit, MI	1/2000 to 8/2004
Adjunct Professor, University of Findlay, Findlay, Ohio	1997 to 8/2004
Instructor; Department of Physics and Astronomy Ohlone College, Fremont, California	12/84 to 8/85

BOARD CERTIFICATION:

- Certified by the American Board of Radiology (**ABR**) in Radiation Oncology Physics, June 2006, and again October 2016.
- Certified by the American Board of Medical Physics (**ABMP**) in Radiation Oncology Physics, August 1997, maintained until 2022.
- Certificate of Equivalency in Radiation Oncology Physics from the American Board of Radiology (**ABR**), February 2003.
- Certified by the Ohio Department of Health (**ODH**) as a Certified Radiation Expert (CRE), May 2000.

NATIONAL AND INTERNATIONAL PROFESSIONAL SOCIETIES MEMBERSHIP:

President, Society of Directors of Academic Medical Physics Programs (SDAMPP)	2018 - 2019
Member, American Association of Physicists in Medicine (AAPM)	1986-present
Member, American College of Radiation Oncology (ACRO)	1998-present
Member, American Society of Therapeutic Radiology and Oncology, (ASTRO)	1990-present
Member, American Association of Medical Dosimetrists (AAMD)	1990-present
Member, International Organization for Medical Physics (IOMP)	1999-present
Member, Board of Directors, American Association of Physicists in Medicine	2014-2017
Member, Steering Committee, Society of Directors of Academic Medical Physics Programs	2007-2012
Member, TG-168 of AAPM, Founding Members of SDAMPP	2007-2012
Member, American College of Medical Physics (ACMP)	2000-2011
Member, Health Physics Society (HPS)	1989-2000
Member, Society of Nuclear Medicine (SNM)	1989-2000

REGIONAL STATE AND LOCAL PROFESSIONAL SOCIETIES MEMBERSHIP:

Radiation Safety Officer, University of Toledo	2012 - 2015
Member, Graduate Admissions Committee, Dept of P&A	2012 - present
Member, Medical Students' Research Committee	2011 - present
Member, Medical School Admissions Committee (UT-HSC)	2007 - present
Member, Graduate Education Council (UT-HSC)	2000 - present
Member, Radiation Safety Committee UT-HSC	1998 - present
Member, X-ray Committee, Serving as Certified Radiation Expert (UT-HSC)	1999 - present
Member, Department of Radiation Oncology QI/QA Committee	1995 - present
Chair, UT Medical Physics Program Steering Committee	2005 - present
Member, AAPM Ohio River Valley Chapter (ORVC-AAPM)	1993 - present
Member, AAPM Great Lakes Chapter (GLC-AAPM)	1998 - present
Member, Cancer Center Clinical Research Review Committee (UT-HSC)	2006 - 2014
Member, Faculty Senate, Representing Radiation Oncology (UT-HSC)	2002 - 2007
Radiation Safety Officer (RSO), Mercy Health Center, OK City	1990-1993
Radiation Safety Officer (RSO), St. Francis Regional Med Center, (Wichita Ks.)	1988-1990
Member, Institutional Review Board (SFRMC)	1988-1990
Member, Department of Radiology Q/A Committee (SFRMC)	1988-1990
Member, Medical Center's Safety Committee (Mercy)	1990-1993

NATIONAL AND INTERNATIONAL BOARDS, COMMITTEES, & ACTIVITIES:

Current:

- **Oral Examiner;** American Board of Radiology (ABR) 2006 - present
- Member AAPM Regional Organizational Committee 2015 – present
- Vice-Chair, International Training and Research Coordination Subcommittee 2018 - present
- Chair, AAPM African Affairs Subcommittee 2016 - present
- Member ASTRO Multidisciplinary QA Subcommittee of the Science Council 2010 - present
- Member Editorial Board, AAPM Newsletter 2012 – present
- Member, IOMP Publication Committee. 2000 - present
- Member, AAPM Exchange Scientist Program Subcommittee (ESPS) 2015 - 2018

NATIONAL AND INTERNATIONAL BOARDS, COMMITTEES, & ACTIVITIES:

Past:

- Member AAPM Work Group on Implementation of Cooperative Agreements
between the AAPM and other National and International Medical Physics Organizations
2012 - 2017
- Member, ASTRO Evaluation of the Emerging Technologies Committee (ETC) 2006 – 2012
- Member ACMP Radiation Therapy Standards Committee 2006 – 2009
- Member, ASTRO Evaluation Subcommittee of the Health Policy Council 2007 - 2011
- **Chairman, Medical Physics Commission, American College of Radiation Oncology
(ACRO)** 2000-2010
- Member, AAPM International Affairs Committee (IAC) 2006 - 2012
- Member, AAPM-IAC as one of the three senior delegate to IOMP 2009 - 2012
- Member, AAPM International Scientific Exchange Program (AAPM-ISEP) 1995-2011
- Member, AAPM Middle Eastern Affairs (MEA) subcommittee 2001-2010
- Member, AAPM Exchange Scientist Program Subcommittee (ESPS) 1997-2009
- Faculty, American Society of Radiologic Technologists (ASRT), annually 2006-2008
- Member, AAPM Nuclear Medicine Committee 1998-2006
- Member, AAPM Professional Information & Clinical Relations TG103 2003-2010
- Member, International Organization of Medical Physics (IOMP) Council 2003-2010
- Member, IOMP Publication Committee. 2000-2010
- Reviewer for ACRO practice accreditation program (ACRO-PAP) 1999-2011
- Co-chair and faculty member of AAPM/ISEP course/workshop
in Bangkok, Thailand. May 2000

AWARDS AND COMMENDATIONS

- May 2015: **Fellowship**, International Organization for Medical Physics (FIOMP)
- December 2014; Recipient of the College of Medicine and Life Sciences Dean's Award for Excellence in Clinical Research. University of Toledo.
- May 2014: Adjunct Professor of Radiation Oncology, First Affiliated Hospital of Wenzhou Medical University, Wenzhou, PR of China.
- August 2011: **Fellowship**, American Association of Physicists in Medicine (FAAPM)
- September 2009: Recognition Plaque Awarded at the World Congress for Medical Physics Annual Meeting in Munich for 9 years of Service as the Editor of the Medical Physics World, the IOMP Bulletin.
- October 2008: Dean's Graduate Mentor Award; University of Toledo Health Sciences Campus
- February 2007: **Fellowship**, American College of Radiation Oncology (FACRO)
- 2004: Winner of the **Simon Kramer Medal**, American College of Radiation Oncology
- 1995: Recipient of Liberato J.A. Didio Excellence in Graduate Research Award from Medical University of Ohio Graduate School
- 1994: Recipient of Liberato J.A. Didio Excellence in Graduate Research Award from Medical University of Ohio Graduate School
- Recipient of 1986-87 Superior Graduate Achievement Award, Department of Nuclear Engineering, Univ. of Missouri, Columbia.
- Member, Sigma Pi Sigma, The National Physics Honor Society.
- Lifelong Instructor Certificates, Physics and Engineering, the California Community Colleges.

MENTORING:

Supervision of medical physicists, medical dosimetrists, postgraduate medical physics trainees, radiation therapists, and graduate students at UT-HSC, Department of Radiation Oncology.
(Please see the list of graduates in Appendix-I)

COMMITTEE MEMBER; GRADUATE STUDENT'S ADVISORY COMMITTEE:

- Currently major advisor to **six** M.S. level graduate students in Radiation Oncology Physics at UT-HSC and direct thesis supervisor for **four** Medical Physics Ph.D. students in the joint medical physics program between UT-HSC departments of Radiation Oncology and Department of Physics & Astronomy.
- Direct supervision of one post-doctoral fellow in radiation oncology physics 2000–2004
(Detail list of students with Dissertation/MS thesis topics in Appendix I)

TEACHING:

- UT-HSC Graduate School; teaching didactic courses and laboratory classes for Master and PH. D. level students in radiation oncology physics.
(*Partial list of classes in Appendix-II, full list available on UT-HSC Catalog.*)
1993 - present
- Physics and Radiobiology of Nuclear Medicine, University of Findlay, Findlay, Ohio;
1997 - 1998
- Taught Physics for Engineers and Electronics course to undergraduate students at Ohlone College, Fremont, CA.
1984-1985
- Advanced Engineering Mathematics and Physics of Radiology, taught at UMC all during the graduate school years at UMC.

NEW COURSES OFFERED:

May 2009 - 2016:

Primary Course Director for an annual 4.5 days nationally advertised course/workshop in “Medical Dosimetry” offered for the candidates who are preparing to take the American Board of Medical Dosimetry Exam. This course is taught by Medical Physics faculty.

Fall 1999: In addition to the existing courses offered at UT-HSC, **primary faculty** for the following new courses from fall semester of 1999.

- Introduction to Theory and Operation of Medical Linear Accelerators;
(3 cr hrs) UT-HSC course # MPHYS 656/856
- Radiation Safety and Measurement in Research and Medicine
(3 cr. hrs); UT-HSC course # MPHY 652/852
This course is in collaboration with Mike Dennis, Ph.D. from UT-HSC Department of Radiology.
- Current Issues in Biological and Medical Physics
(3 cr. hrs): UT course # Phys 6/8390.
This course is in Collaboration with Thomas Kvale, Ph.D. from UT, Department of Physics and Astronomy:

Fall 2017: In collaboration with faculty from UTMC Medical Physics group and chair of department of Physics and Astronomy, initiated a BS degree concentration in Medical Physics.

JOURNAL/EDITORIAL ACTIVITY:

Editorial board member for the AAPM newsletter	2012- present
Reviewer for Journal of Medical Physics; the scientific journal of the American Association of Physicists in Medicine	1995-present

Reviewer for Int Journal of Radiation Onco Biol Physics; the scientific journal of the ASTRO	2013 -present
Reviewer for the Submitted Articles for the Scientific Sessions of the AAPM Annual Meetings	2004 - present
A member of editorial board for EMITEL , the international medical physics dictionary translating to PERSIAN Language.	2013 - 2017
Referee, Moderator/ Chair for Next Generation Dosimetry Radiation Therapy Session, 58th annual meeting of AAPM	July 2016
Editor of the Medical Physics World Bulletin; The Semi-Annual Journal of International Organization Of Medical Physics (IOMP)	2000 – 2009
Referee, Moderator/ Chair for IMRT QA Radiation Therapy Session, 46th annual meeting of AAPM	July 2004
Associate Editor of Medical Physics World Bulletin;	1997-2000
Referee, Moderator/ Chair for Digital Radiography and Digital Mammography Session, 37th annual meeting of AAPM	July 1995

EXTRACURRICULAR ACTIVITIES, AND COMMUNITY SERVICE :

May 2017: EMITEL DICTIONARY of MEDICAL PHYICS

Co-authored completion of nearly 5000 technical words translated/revised from original translation to Persian language for the first online Encyclopedia of Medical Physics and the first Multilingual Dictionary of Medical Physics terms, now posted on IOMP web page at: <http://www.emitel2.eu/emitwwsql/contributors.aspx>

Co-authors: Niroomand-rad, Azam, Pashazadeh, Ali Mohammad, Rasouli, Behrouz, Binesh, Alireza, Mowlavi, Ali Asghar.

March 2011: Public Education on Radiation Safety

Attended as a UT radiation safety expert a meeting sponsored by UT office of Research and Economic Development on the topic of “The Japanese Disaster: Overview of the Event and Resulting Nuclear Power Plant Crisis”, held at the student union. This event was organized by Dr. Frank J. Calzonetti on March 21, 2011 and my topic was “Public Health Concerns over Radiation Release—Japan and the U.S.”.

Junior Achievement; Coach the elementary school children, Ottawa Hills 1999, 2000
Odyssey of the Mind; Coach the elementary school children, Ottawa Hills 1999, 2000
Editor: Journal of Persian-American Regional Society of Northwest Ohio 8/1999-8/2002

PROFESSIONAL CONSULTING SERVICES AS EXPERT MEDICAL PHYSICIST:

Since January of 2006, I have participated in numerous professional activities as an Expert Medical Physicist (EMP) performing various requested tasks. Those include but not limited to litigation cases, error assessment on ongoing litigations and recommendations for action, machine evaluation to verify accuracy of data acquisition, entry, and computer modeling, problem case evaluation and assessments where hospital based operation had determined existence of error and noted wrong patient treatments for a given period and requested overall evaluation.

INVITED LECTURES, SEMINARS, SYMPOSIA, VISITING PROFESSORSHIP: (Partial list)

- **2018, October:** Invited to present two keynotes at the “**Second International Congress of Clinical Oncology**” held in University of Tehran, Tehran, Iran. The congress theme was “Perspectives of Advanced Radiotherapy in Middle Income Countries”, with web page at link: “<http://parimics.isco.ir/page/keynote-speakers>”. Dr. Parsai presented two key notes, participated in three panel discussions, and had multiple smaller special topic discussions with residents and students who had requested discussions on IMRT treatment planning and quality assurance. The two topics presented by Dr. Parsai were:
 - Advanced Radiotherapy in Developing Countries; Investment and Outcomes.
 - Plan of Action to Develop IMRT
- **2018, May:** Inaugural visiting professor in Medical Physics, Cleveland Clinic Foundation
- **2018, January:** Invited speaker for the American Physics Society (APS) conference for undergraduate women in physics held at the University of Toledo.
- **2017, July:** Presented at Tin Whiskers Teleconference, a talk entitled “Whisker growth on Sn thin film accelerated under gamma-ray induced electric field, July 12, 2017. (http://www.dbicorporation.com/Sn_Films_GammaRay_Irradiation_Whisker_Teleconf_7-2017.pdf). Co-authors: Diana Shvydka, Morgan Killefer, Vamsi Borra, Daniel G. Georgiev, Victor G. Karpov, and E. Ishmael Parsai.
- **2016, November:** Invited to present two keynotes to the “**First International Congress of Clinical Oncology**” held in University of Tehran, Tehran, Iran. This congress had 18 invited faculties from outside of Iran, 4 from US (3 physicians and one physicist, Dr. Parsai), and over 550 cancer specialist participants from Iran. Dr. Parsai presented two key notes and had multiple smaller special topic discussions with residents and students who had requested discussions on IMRT treatment planning and quality assurance. The two topics presented by Dr. Parsai were:
 - Advancing from 3D Treatment Planning to IMRT, What Are the Do's and Don'ts?
 - Considerations before Starting SRS and SBRT as it is Practiced in A Modern Radiotherapy Department
- **2015, September:** Invited at the University of Mashhad, Iran to conduct a week long workshop entitled “**The First Course Clinical IMRT Training, A Hands-on**

Workshop” in the country of Iran. Participants included Radiation Oncologists and Medical Physicists who were invited from around the country to learn this technique.

- **2014, May:** Invited Speaker to the First Affiliated Hospital of Wenzhou Medical University in Wenzhou, PR China attending a national conference in “Advances in Medical Physics and Imaging”. Title of my presentation, Image Guided SRS/SBRT: Overview of Dosimetric and Treatment Delivery Considerations.
- **2014, June:** Invited keynote speaker to 11th International Congress of Medical Physics held at University of Tehran. Two presentations, 1) “Image Guided SRS/SBRT, Considerations in Dosimetry and Treatment Delivery”, 2) “Hyperthermia Seed for Treatment of Solid Tumors”.
- **2011, November:** Invited Speaker to Middle Eastern Federation of Medical Physics (MEFOMP) International Conference in Shiraz University (Iran). Presented two key note talks, 1) Analysis of Dose Characteristics from Beveled Applicators in Intra-Operative Radiation Therapy (IORT) Using Monte Carlo Simulation, Wellhoffer Measurement and Film Dosimetry, and 2) Comprehensive QA for Radiation Oncology from TG-40 to TG-142.
- **2011,** Invited speaker to the 18th International Conference on Medical Physics, Science and Technology for Health for All (ICMP-2011) held in Porto Alegre Brazil, April 15-20, 2011. Topic of my talk: “Errors in Radiation Therapy – Root Cause Analysis, Mitigation Steps and Outcomes, US Examples”.
- **2009,** Invited speaker to tumor conference at Bryan Hospitals and Wellness Centers in Bryan, Ohio, presenting a talk entitled: “Latest Technological Advancements in Radiation Oncology for Adjuvant Treatment of Cancer”.
- **2008,** University of Toledo, Early College High School Program, Invited speaker presenting talk on “the Role of Mathematic & Physics in Your Future” for all 2nd and 3rd year early college students.
- **2007,** ASRT annual meeting, Invited faculty speaker for a workshop on IMRT delivery comparisons, Los Angeles, CA.
- **2007,** AAPM annual meeting, Guest speaker for Dot Decimal company, the manufacturers of Solid Compensators in their booth.
- **2007,** April 12; Presented an IMRT workshop in Bryan Hospitals and Wellness Centers (CHWC) for 4 CME credits, participants: radiation oncology physician, physics staff, therapists, & other clinical staff
- **2006,** May 24; Invited Speaker for a **CME event** for physicians by Bryan Hospital and Wellness Center to speak on “Latest Developments in Treatment of Early Stage Breast Cancer” Bryan, Ohio,

- **2006**, April 29; Invited Speaker by CYTYC corporation to speak on “Mammosite Treatment Planning – A Clinical Prospective” in a one day **CME credited training program** at the Cleveland Clinic Foundation.
- **2006**, Jan. 16; Speaker for a **CME event** to present “ New Innovations and Advances in Radiation Oncology” at the Oncology Team Meeting in Community Hospitals and Wellness Centers in Bryan, Ohio.
- **2006**, January 12; Member of a panel of experts sent to the Nassau, Bahamas, by the American College of Radiation Oncology (ACRO) to review the activities of “The Bahamas Radiation Services, Ltd” for ACRO practice accreditation.
- **2005**, March 3; Member of a panel of experts sent to Lima, Peru by ACRO as a delegate to the 2005 Congress of Central American Radiation Oncology Meeting (CRILA).
- **2005**, July 4; Member of a panel of experts sent to Rome, Italy by ACRO to review the activities of “The Universita Catolica, Rome” for ACRO practice accreditation.
- **2004**, July; Invited Speaker for the Colloquium Series of University of Toledo Department of Physics and Astronomy “Medical Physics, A Non Oxymoron”.
- **2004**, May; Key Note Invited Paper #1 on” Analysis of Dose Characteristics From Beveled Applicators in Intra-operative Radiation Therapy (IORT) Using Monte Carlo Simulation, Water Scan Measurement and Film Dosimetry. Presented at the 6th International Congress of Medical Physics Held in University of Mashhad, Iran.
- **2004**, May; Key Note Invited Paper #2 on "Monte Carlo Based Treatment Planning For Linac Based Stereotactic Radiosurgery As Compared to Conventional Treatment Planning Systems". Presented at the 6th International Congress of Medical Physics Held in University of Mashhad, Iran.
- **2003**, April; Invited Paper on “Review of Progress in Prostate Seed Implant”, Annual meeting of the Ohio River Valley Chapter of AAPM annual meeting, University of Kentucky.
- **2002**, June 1-6; Member of a panel of experts sent to Rome, Italy by the American College of Radiation Oncology to review the activities of “The Universita Catolica, Rome” for ACRO accreditation.
- **2001**, June 2-5; Invited speaker to the American College of Medical Physics (ACMP) annual meeting presenting the Physics of ACRO practice accreditation Hershey, PA.
- **2000**, May; One of the five faculty members from United States to be invited as lecturer to the International Scientific Exchange Program Workshop, to be held in Bangkok, Thailand. This workshop was supported and sponsored by the AAPM, and the IOMP.
- **1999**, April; the Ohio Society of Radiological Technologists, Inc. Invited speaker at the annual meeting.

- **1998**, Invited Speaker at the Annual Meeting of the Specialized Topics in Areas of Radiological Sciences (STARS).
- **1998**, Invited Speaker for the Colloquium Series of University of Toledo Department of Physics and Astronomy.
- **1997**, Invited Paper, Annual meeting of the Northwest Ohio Imaging Society.

MAJOR AREAS OF RESEARCH INTERESTS:

- Development of Innovative Detectors and Sensors for Applications in Radiation Medicine
- Development and Implementation of New and Innovative Tools and Treatment Devices/Techniques in Radiation Oncology for External Beam Radiotherapy and Brachytherapy Applications
- Radiation Dosimetry Modeling using Monte Carlo Simulation Techniques in Radiotherapy Applications
- Optimization Techniques in External Beam Radiotherapy, Brachytherapy, and in Stereotactic Radiosurgery Treatments
- Applications of Bremsstrahlung SPECT Imaging in Computing Quantitative 3D Dosimetry and Mapping 3D Dose Distributions for Beta Emitting Radionuclides.
- Various Applications of Computers in Medicine

PATENTS & INVENTIONS:

1. Parsai, E.I., Feldmeier, J.J.;

Title: Flattening Filter Free Accelerator for Advanced External Beam radiotherapy.

Invention of a new technique in using a non-uniform x-ray beam generated from a flattening filter free linear accelerator for external beam treatments. Patent application initiated in 2005. Patents issued in US (June 2016), and China (May 2014).

US patent#: 9,370,672; U.S. Provisional Patent Application Serial No.: 60/775,677, UT Docket #: D2006-02

2. Parsai, E.I., Feldmeier, J.J.

Title: A New GYN Catheter System for Delivery of High Dose rate Brachytherapy.

This invention is a new device to replace the conventional Fletcher Suit Device applicator (FSD) which is used conventionally in treatment of cervical and endometrial cancer.

US Patent#: 8,348,825; US B2 Provisional Patent#: US 2010/0069878 A1.

3. Parsai, E.I., Shvydka, D., Kang, Jun;

Title: Medical Applications of Thin Film CdTe Used as a Gamma Ray Detector and in Sensor/Detector Technology for Energy Ranges Common to Diagnostic Imaging and Radiation Therapy.

This technology utilizes a layer of high atomic number and density functioning as a converter transforming high energy X-rays into the Compton electrons impeding onto CdTe single polycrystalline or multi-stack thin-film detector operating in pulse mode. Such a converter replaces the standard scintillators used with a-Si devices. A layer of Pb less than 3 mm thick in combination with low-Z material such as polystyrene, used for filtering out low-energy scatter, is suitable for the converter. The UT-HSC has initiated a patent application for this idea in August 2007. Patent Serial #: 61/011,283 UT file number D228 2008-02.

4. Parsai, E.I., Feldmeier, J.J.

Title: Concurrent Delivery of Interstitial ThermoBrachytherapy (Hyperthermia and Brachytherapy) in Treatment of Cancer.

The purpose of this research is to include the advantages extended by concurrent hyperthermia and radiation treatments. A single seed is proposed to be designed and constructed to contain both ¹²⁵I and ferromagnetic materials for hyperthermia application. The inner section will be made of Ni-Co, a ferromagnetic material with a curie temperature of 48.2 °C. The outer layer will be composed of Platinum to allow the seed to be compatible with the human body. A Treatment Planning system will be used to determine the precise location and the number of seeds that need to be inserted in the target volume. Hyperthermia segment of the treatment will be induced through the use of a strong magnetic field in the order of 5000 A/m. One gauss is 86 A/m resulting in approximately 58 Gauss (a range of 50- 100 gauss will be considered).

US Patent #: 9,750,954, (June 20, 2017); UT Patent File #: D228 2008-24.

5. Parsai, E.I., Shvydka, Diana., and Warrell, Gregory

Title: System for Concurrent Delivery of ThermoBrachytherapy in the Treatment of Cancer.

After much research in using Ni-Co alloy for this purpose, we realized that with blood perfusion more magnetic conduction power is needed to compensate for the heat loss. Using a ferrite alloy with some modifications in design of the seed we were able to achieve that objective.

The UT-HSC filed a provisional patent application for this idea in March 2008.

US Patent #: 9,750,954 (September 5, 2017); UT Patent File #: D228 2008-24.

6. **Parsai, E.I.**, Sperling, N.N.; Invention Disclosure with GAMMEX Inc. (June 2010)
Title: Development of a Software Package for Using a Spiral Phantom to Be Used For IMRT Quality Assurance Plan Delivery Verification.

The phantom utilizes a cylindrical solid water system manufactured by GAMMEX with a machined spiral trajectory cut through it for insertion of radiochromic film (GAFCHROMIC® EBT2). The phantom has been machined exactly to create this cavity for placement of film sheet in the spiral configuration. The system can be used to compare predicted planar fluence dose from treatment plans with the measured dose using film dosimetry. This phantom is capable of predicting and measuring data in a three dimensional (3D) subspace which had not previously been demonstrated. Comparison of the predicted and measured data provides both a quantitative and visual qualitative assessment of the intended treatment plan to be delivered. The advantage of this phantom and the associated software is in that it provides a quantitative and qualitative IMRT plan analysis tool. The phantom acquires data in 3D, however, through de-convolution of the data one can obtain a 2D data set for direct comparison and to take advantage of the existing dosimetric tools. Film dosimetry offers better resolution than the discrete-element units now in the market and the advantage of EBT-2 over conventional film.

7. Sperling, N.N., **Parsai, E.I.**; Invention Disclosure with Phillips Company. (August 2010)
Title: Development and Modeling of a Miniature Multi Leaf Collimation System (mMLC) in Philips Pinnacle Treatment Planning System for Stereotactic Radiosurgery (SRS) Applications.

The Pinnacle software system which is the main treatment planning package sold by Phillips currently has no SRS module for radiation delivery using the mMLC system. Elekta Inc., and its parent company (Philips) however, sell a mMLC package and another separate software package called “ERGO++” for SRS applications. We have developed as a module within Pinnacle the SRS package where the mMLC can be used and the ERGO++ software system may be totally retired.

8. **Parsai, E.I.**, Sperling, N.N.; Invention Disclosure with University of Toledo (2014) Title: Novel algorithm for the reconstruction of entrance beam fluence in radiation oncology The method developed here employs the use of EPID images and an iterative deconvolution algorithm to reconstruct the impinging primary beam fluence on the patient. This primary fluence may then be employed to determine dose through the entire patient volume. The method requires patient specific information, including a CT for deconvolution/dose reconstruction. With the large-scale adoption of Cone Beam CT (CBCT) systems on modern linear accelerators, a treatment time CT is readily available for use in this deconvolution and in dose representation.

9. White, T., **Parsai, E.I.**; Invention Disclosure:
Title: Development of a Balloon Brachytherapy Device Capable of Delivering Combined Radiation and Hyperthermia for Treatment of Cancer.

This technology allows application of Balloon Brachytherapy typically used in treatment of partial breast irradiation to be combined with hyperthermia treatment. A prototype balloon applicator and thermal heating and control system has been developed which uses a hybrid central lumen, constructed of aluminum and PTFE, for heating of the surrounding fill solution by a removable miniaturized resistive heating element. The temperature of the fill solution is controlled by a feedback loop system utilizing a thermocouple and proportional-integral-derivative (PID) industrial temperature controller unit. The hybrid central lumen incorporates an aluminum core, which has a larger linear attenuation coefficient than the typical all-plastic construction of PBI balloon applicators. A complete prototype balloon applicator and heating

control has been constructed to do the preliminary measurements and modeling. The device shows the potential to further expand the potential patient population qualifying for partial breast irradiation, or conversely reducing local recurrence rates, thus providing an enhanced treatment option with minimized side effects.

10. Karpov, V., Parsai, E.I., Shvydka, D.; (August 2014)

Title: True Multilayer Thin Film Detector for Imaging and Spectroscopy

In this invention, we propose a true multilayer direct conversion detector system whereby we stack multiple layers of polycrystalline CdTe based photovoltaic structures, each ~5-10 μm thick. As opposed to a situation of reading signal from one layer, a multi-layer approach results in excessive information leading to over-constrained system of equations (multiple equations for same pixels in each layer), allowing strong suppression of noise through use of variational methods of signal processing with regularization (well developed techniques: astronomy, CT imaging, etc.). In our signal processing approach we utilize independent reading and mutual comparison of each of the many layers, which tremendously increases the amount of collected information. For example, the image sharpness becomes superior due to the existing mathematical algorithms of image restoration (regularization algorithms) based on many noisy images of an object; in our case such noisy (noisy due to the thinness of the film) images correspond to individual layers of the detector. Furthermore, comparing signals from different layers and using the existing regularization algorithms, one can restore the radiation spectrum. Serial #: US 62/033,976 filed 8-6-14; UT Docket: D2015-08

11. **Parsai, E.I.**, Elahinia, M.; Provisional application#: 35 U.S.C. § 111(b)

Title: Using Shaped Memory Alloy (SMA) Manufactured From Nitinol material for Organ Positioner in Radiation Oncology Applications.

We have developed an organ positioner using SMA manufactured from Nitinol material to move critical structures away from the source of radiation. In radiation oncology applications the use of SMA actuation can be extremely beneficial in sparing the surrounding normal tissues and critical structures by simply relocating the structure away from the path of the external beam or place distance between the structure and source of radiation in cases of brachytherapy. One immediate example is repositioning rectum in Brachytherapy applications where the SMA is manufactured as a rectal marker/repositioner. Implementation of this device in conjunction with IMRT, particularly SBRT of the prostate could open new possibilities for dose escalation and significant dose reduction to normal tissues. Provisional patent application. Filed with application S/N 62/353,347 in June 2016; followed by US application S/N 15/630,606 filed in June 2017.

Current Active Grants:

SUBMITTED RESEARCH GRANT PROPOSALS:

- Date submitted: April 5, 2018
PI: **Parsai, E.I.**, Co I's: Shvydka, D., Elliott, D., Sindhvani, p., Warrell, G., Attaluri, A., Mian, O., Parsai, S., and from BEST Medical, Subramanian, M.
Agency/Mechanism: NIH - STTR Phase II Grant with BEST Medical
Title: Feasibility of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer
Requested fund: \$1,725,000.00 for a period of 3 years, September 2018- October 2021.
Result: Awaiting decision.

PAST FUNDED RESEARCH SUPPORT, TRAINING GRANTS:

- Date Submitted: September 1, 2017
Title: Organ Repositioner: Enhancing the Safety of Radiation Therapy in Treating Pelvic Tumors
PI: Parsai, E.I.; Co-I's: David Elliot, and Elahinia, Mohammad
Agency/Mechanism: UT Rocket Fuel Fund (UTRFF)
Funding period: 09/01/2017 - 08/31/2018
Award Amount: \$75,000.00 (\$40,000.00 from UTRFF, \$10,000 matching fund from Radiation Oncology, and \$25,000.00 from NextTech funds).
Results: Awarded on 11/20/2017
- Date of submission: September 22, 2011
PI: Changhu Chen M.D., and Lawrence H. Anderson, Ph.D. (chairs of Radiation Oncology and Physics & Astronomy respectively).
Co-PI's: Diana Shvydka, Ph.D., and **E. I. Parsai, Ph.D.**
Agency/Mechanism: Nuclear Regulatory Commission (NRC)
Title: Joint Initiative In Developing a New Type of Nuclear Radiation Detector Through Faculty Development Between the Departments of Radiation Oncology and Physics & Astronomy.
Requested Funding: \$345,436.00 for three years
Results: Awarded on June 6, 2012
- Date submitted: September 1, 2010
PI: **Parsai, E.I.**, Co I's: Feldmeier, J., Shvydka, D., Li, C., and from BEST Medical, Manny Subramanian,
Agency/Mechanism: NIH - STTR Grant with BEST Medical
Title: Feasibility of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer
Requested fund: \$116,000.00 for a period of 1 year, September 2011- October 2012.
Result: Awarded on September 2011.
- Date submitted: September 2009
PI: **Parsai, E.I.**
Agency/Mechanism: University of Toledo SBIR/STTR "Phase Zero" grant

Title: Development of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia in Treatment of Prostate Cancer

Requested funding: **8,000** for 1 year.

The project is intended for submission to Phase I STTR NIH in collaboration with a manufacturer

Result: Awarded

- Date submitted: October 2009
PI: **Parsai, E.I.**, Co-I: Michael Dennis.
Agency/Mechanism: UT, Bowling Green State University (BGSU), and MUO under the umbrella of Collaborative Signature Research Program
Title: Applications of Large-Area Photo-Electronic Materials and Devices in Detectors and Sensors.
This grant was originally submitted to the consortium on February 10, 2006 for a total of \$300,000 to be divided among the PI's on each campus; MUO share was \$100,000
Result: AWARDED **\$100,000**

- Date of submission: January 2006
PI: **Parsai, E.I.**,
Agency/Mechanism: dot-Decimal Inc., the manufacturer of Solid Compensator for IMRT treatments
Title: Comparison between IMRT Dose Delivery using Tungsten Multileaf Collimators versus Compensating Filters
Grant was in the form of software package license and compensating materials for 10 patients to study solid compensators in contrast to MLC.
Period of Grant: January 2006 through May 2007.
Result: AWARDED **\$42000.00**

- Date submitted: March 2005
PI: **Parsai, E.I.**
Agency/Mechanism: Elekta Inc.
Title: Clinical Assessment of High Dose Rate Photon Beams from a Flattening Filter Free Linear Accelerator for IMRT and Stereotactic Radiosurgery Treatments
Period of grant: June 2005 – December 2007
Result: AWARDED **\$605,000.00**

As the PI on this project which is supported by Elekta Inc. in the last two and a half years, we have successfully modeled 6 and 10 MV high dose rate photon beams, without a flattening filter in the beam path, which currently is not available in Elekta accelerator units. This Monte Carlo high dose rate machine is intended to be used in IMRT and Stereotactic Radiosurgery treatments. This particular technology has been submitted for patent through UT-HSC in February 2006 and Elekta has entered into agreement with UT-HSC to develop the technology on their accelerator units. The total investment on their part has been over **\$125,000.00** in engineering time, materials, and licensing fee to allow a non-flat physical beam be generated on our machines. They also have agreed to place in our department a treatment planning software system priced at **\$485,000.00** for feasibility evaluation of conventional IMRT cases with this high dose rate beam.

- Date submitted: July 2000
P.I. Feldmeier, J.J., co-I: **Parsai, E.I.**
Agency/Mechanism: Undersea and Hyperbaric Medical Society
Title: Undersea and Hyperbaric Medical Society" to study: Hyperbaric Oxygen as Prophylaxis Against Brain Radiation Necrosis
Period of grant: July 2000 – July 2003
Result: AWARDED **\$5,000.00**

- Date submitted: July 2000
P.I.: **Parsai, E.I.**
Agency/Mechanism: **"Technology Action Fund"** of the State of Ohio.
Title: Design and implementation of a prototype for patient profile data acquisition using laser technology, reconstruction of a 3D image from this laser data and fusion of the reconstructed image on diagnostic images from PET, SPECT, CT, or MRI, data.
As P.I./ project supervisor in collaboration with AvantGarde Technology LLC, a branch of Edison Industrial Systems Center (**EISC**) of Toledo, Submitted a proposal to the **"Technology Action Fund"** of the State of Ohio entitled:

Period of grant: July 2000 - December 2000
Result: AWARDED **\$86,131.00**

- September 2000: **AWARDED \$20,000.00** from **"Mallinckrodt Technology in St. Louis Missouri"**. Dates: September 2000 through December 2002.

Submitted as **P.I.**, a proposal to Mallinckrodt Medical Inc., located in St. Louis Missouri to study the possibility of direct tumor infusion of Colloidal P-32 as a radiation boost for treatment of prostate cancer. The grant was to receive from Mallinckrodt the P-32 and associated radiopharmaceuticals such as macroaggregated albumin (MAA) up to five badges amounting to a total of \$20,000.00.

- May 1998: **AWARDED \$5,000.00** grant from "Amersham Healthcare Medipysics, Inc.". Dates: May 1998 – May 2000.

Submitted as **P.I.** a proposal to Amersham To Study Patients on Renal Dialysis Who Have Received METASTRON Sr-89 Radiopharmaceutical.

- December 1997: **AWARDED \$10,000:** A grant from the Toledo branch of Edison Industrial Systems Center. Dates: December 1997 – December 1998.

Submitted a proposal to EISC, as **P.I.** for: "Creating an image conversion software to read CT images from Unix environment into a PC, and providing tools to contour regions of interest in PC environment and save. The images with identified regions are then read back in UNIX and used for treatment planning and other applications."

RESEARCH GRANT PROPOSALS (UNFUNDED):

Please see Appendix III.

CURRENT ACTIVE PROTOCOLS APPROVED BY UT-HSC's INSTITUTIONAL REVIEW BOARD (IRB):

Current:

- UT-HSC) IRB #202772 – Applications of a Rectal Retractor in Radiotherapy Treatment of Pelvic Tumors. (June 2018).
- UT-HSC) IRB #202668 – Retrospective Analysis of 3-Dimensional Pancreas Matching Based on Bone and Soft-Tissue Alignment. (August 2018).

Previous:

- (UT-HSC) IRB #105163 - The Parsai-Feldmeier Gynecologic Brachytherapy Applicator: Functional Studies.
- (UT-HSC) IRB #94-141: Interstitial Colloidal P-32 Integrated in the Treatment of Non-Resectable Pancreatic Cancer
- (UT-HSC) IRB #102493: A Hybrid Intelligent Decision making System for Pulmonary Embolism Diagnosis Using Ventilation-Perfusion Scan Images.
- (UT-HSC) IRB #98-343: Development of Image Package Conversion Software for 3-D Conformal Radiotherapy, and Feasibility Study for Acquisition of Patient Profile Using Laser Technology.

CONTINUING EDUCATION AND TRAINING:

See Appendix IV for a Detail List...

CLINICAL SERVICE:

- Directly involved in development of the new Dana Cancer Center in departmental design, equipment selection, shielding calculation for Linac Vaults and for the HDR room. Point person to work with architects in all aspects of room preparations, materials layout, and radiation safety and protection.
- As the chief of Medical Physics division, I am also responsible for acceptance testing, commissioning, interconnectivity, and all other technical operation of the equipment we have in radiation oncology department at UTMC and in Wood County Cancer Center in Bowleen Green, Ohio, which is a remote site we cover. From January 1998 through August 2016, served as the chief medical physicist at Bryan Community Hospitals and Wellness Center (CHWC). The existing equipment at Wood County include: A Varian True Beam linear accelerator equipped with multi-leaf collimation and **dynamic wedge system, Cone beam CT**, and MV portal imaging capabilities. This unit is also capable of **IGRT**, and **IMRT** radiation treatment deliveries. A Siemens large bore CT-Sim unit, Eclipse treatment planning system, ARIA patient management and R&V system. Also at UTMC campus, we have a True Beam Linear Accelerator, an Edge Linac (the 4th installation in the world), Pinnacle and Ray Station RTP systems, **ARIA** patient management and a **Philips CT-PET** unit with simulation capability.
- In our clinics we also manage a **RIT** film dosimetry system, **RADCALC** for IMRT dosimetry calc check, **OSLD** dosimetry system and **TLD** dosimetry system.
- Responsible for all radiation safety and protection as the certified radiation expert (**CRE**) for both Wood County radiation therapy center, and UTMC, Department of Radiation Oncology.
- I also serve as technical advisor to administration of UTMC and Wood County for providing technical specification of Linear Accelerators, PET/CT units, and other high tech equipment we consider for radiation treatment.
- At the time we purchased the Elekta accelerators, we retrofitted to the Elekta SL-25 accelerator head the existing **IORT** applicators, performed all the necessary dosimetric measurement to bring on line this modality.
- Directly involved in **Development of Linac Based Stereotactic Radiosurgery**, installation and testing of all equipment and responsible for development of QA for this project. The SRS capability has been at UTMC since 1995 when we had in-house developed software package. The SRS system we had in the old hospital building up to year 2013, was the 3Dline mMLC collimator system with 3mm leaf width which was retrofitted to the head of the SL-25 linear accelerator. I was responsible for commissioning and acceptance testing of the Ergo++, the 3D line software package for SRS capability, and data acquisition from the mMLC for planning and delivery.
- Responsible for all other Clinical Medical Physics Services offered by the Department of Radiation Oncology, including: **all routine clinical activities** and **Quality Assurance, Quality Improvement** aspects of radiation therapy physics.
- Responsible for the medical physics aspects of all **three dimensional and conformal radiotherapy treatment planning** cases.
- In 1993 we developed the 3D dosimetry for the **Infusional Brachytherapy technique** at UTMC (known as the MCO), where we used P-32 for treatment of non-resectable pancreatic cancer. MCO was one of the sites participated in the national phase II trial of this project.
- Responsible for development and maintenance of the first departmental web page for the Radiation Oncology Department at MCO. (<http://www.mco.edu.depts.radther>)

RESEARCH AND PUBLICATIONS

A. SUBMITTED & PUBLISHED PEER REVIEWED ARTICLES:

51. **Parsai, E.I.**, Jahadakbar, A., Lavvafi, H., and Elahinia, M.; “A New and Innovative Device to Retract Rectum during Radiation Therapy Applications of Pelvic Tumors”, Accepted for publication: Journal of Applied Clinical Medical Physics, October 2018.
50. Bogue, Jon, **Parsai, E. I.**, Wan, Jui, Lavey, R.; Dosimetric Comparison of VMAT with Integrated Skin Flash to 3D Field-in-Field Tangents for Left Breast Irradiation; Accepted for publication: Journal of Applied Clinical Medical Physics, October 2018.
49. **Parsai, E.I.**, Ulizio, V., Eckstein, J. M., and Reddy, K., “Quantitative Assessment of the Efficacy of Two Different Treatment Plan Optimization Algorithms in Treating Tumors in Locations of High Heterogeneity”; Submitted to the Journal of Radiation Oncology, September 2018.
48. Mathew, D., Arora, V., Tanny. S., Sperling, N., and **Parsai, E.I.**; Comparison of Polarity Effects between Horizontal and Vertical Mounted Small Volume Ion Chambers for Dosimetry of Small-Fields; Submitted to the Journal of Applied Clinical Medical Physics, January 2018.
47. Tanny, S., Sperling, N., Harrell, D., Noller, J., Chopra, M., and **Parsai, E.I.**; Tenth Value Layer Thicknesses of High Density Concretes for 6, 10 and 18 MV, Submitted to Medical Physics, January 2018.
46. Dabiri, D., McDonald, N., Yazdanpanah, O., Dabiri, B., Baugh, R., **Parsai, E.I.**, Nedley, M.; Dental Subcutaneous Emphysema: an Investigation Using a Fresh Cadaver; Accepted for Publication, Journal of the American Dental Association, August 2017.
45. Killefer, M., Borra, V., Al-Bayati, A., Georgiev, D.G., Karpov, V.G., **Parsai, E.I.**, and Shvydka, D., Whisker Growth on Sn Thin Film Accelerated under Gamma-Ray Irradiation; Published on ArXiv: <https://arxiv.org/abs/1705.10911>; Also published in Journal of Physics D, Applied Physics. (J. Phys. D: Appl. Phys. 50, 405302, 7pp) 2017.
44. Rasuli, B., Mahmoud-Pashazadeh, A., Niroomand-Rad, A., **Parsai, E.I.**; Report of An Update to the Persian Translation of Medical Physics Terms: EMITEL International Dictionary; Medical Physics International Journal, vol.5, No.1, pp 79-81, April 2017.
<http://mpijournal.org/pdf/2017-01/MPI-2017-01-p079.pdf>
43. **Parsai, E.I.**, Ouhib, Zubir, Orton, C.G.; In the Era of IGRT and Small and Focal Field External Beam Radiotherapy, Brachytherapy is a Dying Modality; Accepted for publication; Medical Physics January 2017. <http://onlinelibrary.wiley.com/doi/10.1002/mp.12016/epdf>
42. Parsai, S., Dalhart, A.M., Chen, C., **Parsai, E.I.**, Pearson, D., Sperling, N., Reddy, K.; Assessing the Accuracy of Dose Delivery in CBCT-Guided Stereotactic Body Radiation Therapy for Lung, Chest Wall, and Liver Metastatic Lesions: Techniques for Image Co-registration; Submitted to Journal of Radiation Oncology; March 2016.

41. Paudel, N., Shvydka, D., and Parsai, E.I.; Thin-Film CdTe Detector for Microdosimetric Study of Radiation Dose Enhancement at Gold-Tissue Interface; Journal of Applied Clinical Medical Physics, Vol 17, #5, pp 500-508, September 2016. (Received the Award of Excellence for the Best Radiation Measurement Article in 2016).
40. Paudel, N., Shvydka, D., and **Parsai, E.I.**; A Novel Property of Gold Nanoparticles: Free Radical Generation Under Microwave Irradiation; Medical Physics 43 (4), pp 1598, doi: 10.1118/1.49428111598; April 2016.
39. Warrell, G., Shvydka, D., and **Parsai, E.I.**; Use of Novel Thermo-Brachytherapy Seeds for Realistic Prostate Seed Implant Treatments; Med. Phys. 43 (11), pp 6033-6048, November 2016.
38. Paudel, N., Shvydka, D. and **Parsai, E.I.**; Comparative Study of Experimental Enhancement in Free Radical Generation Against Monte Carlo Modeled Enhancement in Radiation Dose Deposition Due to the Presence of High Z Materials During Irradiation of Aqueous Media; International Journal of Medical Physics, Clinical Engineering and Radiation Oncology, Vol. 4, #4, Nov 2015. <http://dx.doi.org/10.4236/ijmpcero.2015.44036>
37. Vasko, A.C., Warrell, G.R., **Parsai, E.I.**, Karpov, V.G., and Shvydka, D., Evidence of rapid tin whisker growth under electron irradiation; Journal of Applied Physics, 118, 125301 (2015); doi: 10.1063/1.4931426 September 2015. <http://arxiv.org/abs/1505.00822>
36. Tanny, S., Sperling, N., and **Parsai, E.I.**; Correction Factor Measurements for Multiple Detectors used In Small Field Dosimetry On The Varian Edge Radiosurgery System, Med. Phys. 42 (9), pp 5370-5376, September 2015.
35. Tanny, S., Holmes, S., Sperling, N., and **Parsai, E.I.**; Influence of Compton Currents on Profile Measurements in Small-volume Ion Chambers; Medical Physics, Vol. 42, No. 10, pp 5768-5772, October 2015. <http://dx.doi.org/10.1118/1.4929555>
34. Sperling, N., Parsai, E.I.; An Algorithm for the Reconstruction of Entrance Beam Fluence Using Virtual Exit Electronic Portal Images; International Journal of Medical Physics, Clinical Engineering and Radiation Oncology, vol. 4, pp 177-183; May 2015. <http://dx.doi.org/10.4236/ijmpcero.2015.42022>
33. Tanny, S., Sperling, N.N., and **Parsai, E.I.**; Investigation of Scattered Radiation Dose at the Door of a Radiotherapy Vault when the Maze Intersects the Primary Beam; Journal of Medical Physics, vol. 6, No. 2, 141-149, Feb. 2015. (<http://www.scirp.org/journal/Articles.aspx?searchCode=tanny&searchField=All&page=1>)
32. **Parsai, E.I.**, Ye, S.J., and Tanny, S.; Independent Integral Measurement of the Total Source-on Time for a High Dose Rate (HDR) Remote Afterloading System; Medical Physics International Journal, Vol 2, Number 1; IOMP.org; pp54-56; May 2014.
31. **Parsai, E.I.**, Baldock, C., ;Practicing and Aspiring Medical Physicists Can Safely Disregard University Rankings at no Peril to Them; Med. Phys. 41 (5), May 2014. <http://scitation.aip.org/content/aapm/journal/medphys/41/5/10.1118/1.4866835;jsessionid=q84gf5lcgoby.x-aip-live-01>

30. Gautam, B., Warrell, G., Shvydka, D., Subramanian, M., and **Parsai, E. I.**; Practical Considerations for Maximizing Heat Production in a Novel Thermo-Brachytherapy Seed Prototype; Medical Physics vol 41, #2, February 2014.
29. Shvydka, D., Jin, Xiance, and **Parsai, E.I.**; Performance of Large Area Thin-Film CdTe Detector in Diagnostic X-ray Imaging; International Journal of Medical Physics, Clinical Engineering and Radiation Oncology, vol #2, pp 98-109; Aug 2013.
28. Delos Santos, J., Popple, R., Agazaryan, N., Bayouth, J., Bissonnette, J-P., Bucci, k., Dieterich, S., Lei, D., Forster, K, Indelicato, D., Katja, L., Lehmann, J., Mayer, N, **Parsai, E. I.**, Salter, W., Tomblyn, M., Yuh, W., Chetty, I.; Image-guided Radiation Therapy (IGRT) Technologies for Radiation Therapy Localization and Delivery; Ref.: Ms. No. ROB-D-12-01252R2; Int J Radiation Oncol Biol Phys, Vol. 87, No. 1, pp. 33-45, Feb 2013.
27. Oghabian, M.A., Riazi, R., **Parsai, E.I.**, Aghili, M., Jaberi, R.; Using Digitally Reconstructed Radiographs from MRI (MRI-DRR) to Localize Pelvic Lymph Nodes on 2d X-Ray Simulator-Based Brachytherapy Treatment Planning; Frontiers in Biomedical Engineering 1(1); 24-30; 2013.
26. Gautam, B., **Parsai, E.I.**, Shvydka, D., Feldmeier, J.J., Subramanian, M.; Dosimetric and Thermal Properties of a Newly Developed Thermobrachytherapy Seed with Ferromagnetic Core for Treatment of Solid Tumors; Med Phys. 39(4) pp 1980-1990 April 2012.
25. **Parsai, E.I.**, Gautam, B., Shvydka, D.; Evaluation of a Novel Thermobrachytherapy Seed for Concurrent Administration of Brachytherapy and Magnetically Mediated Hyperthermia in Treatment of Solid Tumors; J Biomed Phys Eng; 1(1), pp 5-16, 2011
24. Zhu, T. C., **Parsai, E.I.**, and Orton, C.G.; PDT is better than alternative therapies such as brachytherapy, electron beams, or low-energy x rays for the treatment of skin cancers; Med. Phys. 38 (3), pp 1133-1135, March 2011.
23. **Parsai, E.I.**, Shvydka, D., Kang, J., Chan, P., Pearson, D., and Ahmad, F.; Quantitative and Analytical Comparison of Isodose Distributions for Shaped Electron Fields from ADAC Pinnacle Treatment Planning System and Monte Carlo Simulations"; Applied Radiation and Isotopes, 68 (2010) 2174–2180; September 2010.
22. **Parsai, E.I.**, Shvydka, D., and Kang, J.; Design and optimization of large area thin-film CdTe detector for radiation therapy imaging applications; Medical Physics vol. 37, No. 8, pp 3980-3994, August 2010.
21. **Parsai, E.I.**, Shvydka, D.; Response to Letter to the Editor published in ARI 67 (2009) 206-207; Surface and build-up region dose analysis for clinical radiotherapy photon beams; Journal of Applied Radiation and Isotopes Vol 68, Issue 3, PP 467-68, March 2010.

20. Buyyounouski, M.K., Price, R.A. Harris, E.R., Miller, R., Tome, W., Schefter, T., **Parsai, E.I.**, Konski, A., Wallner, P.E.; Stereotactic Body Radiotherapy (SBRT) For Primary Management of Early-Stage, Low-Intermediate Risk Prostate Cancer: Report of the ASTRO Emerging Technology Committee (ETC); Int. J. Radiation Oncology Biol. Phys., Vol. 76, No. 5, pp. 1297–1304, 2010.
19. **Parsai, E.I.**, Zhengdong, Z. Feldmeier, J.J.; A Quantitative Dose Attenuation Analysis Around Fletcher-Suit-Delclos (FSD) Due to Stainless Steel tube for HDR Brachytherapy by Monte Carlo Calculations; Brachytherapy Journal, vol 8, Issue 3, Pages 318-323, July 2009.
18. Kang, J., **Parsai, E.I.**, Albin, D., Karpov, V.G., and Shvydka, D.; From Photovoltaics to Medical Imaging: Applications of Thin Film CdTe in X-ray Detection; Applied Physics Letters, 93, 223507-3; December 2008.
17. Shvydka, D., **Parsai, E.I.**, and Kang, J.; CdTe Thin-Film Detector for High-Energy Photon Beams: Radiation Hardness Study; Nuclear Instruments and Methods in Physics Research Section A; 586; pp 169-173, 2008.
16. Zhengdong, Z., **Parsai, E.I.**, Feldmeier, J.J.; A 3-D Quantitative Dose Reduction Analysis in MammoSite Balloon by Monte Carlo Calculations Monte Carlo Calculation, Journal of Applied Clinical Medical Physics, Vol 8, Number 4, PP 1-13, Fall 2007
15. Choi, C.H., Ye, S.J., **Parsai, E.I.**, Shen, S., Meredith, R., Brezovich, I., Ove, Roger; Dose Optimization of Breast Balloon Brachytherapy Using a Stepping 192 Ir HDR Source; Journal of Applied Clinical Medical Physics, Vol 10 #1, pp 90-102; Winter 2009.
14. **Parsai, E.I.**, Shvydka, D., Pearson, D., Gopalakrishnan, M., and. Feldmeier, J.J.; Surface and build-up region dose analysis for clinical radiotherapy photon beams; Journal of Applied Radiation and Isotopes, pp 1438-14428; 66; 2008.
13. **Parsai, E.I.**, Pearson, D. Kvale, T.; Consequences of Removing the Flattening Filter from Linear Accelerators in Generating High Dose Rate Photon Beams For Clinical Applications; A Monte Carlo Study. Nuclear Instruments and Methods in Physics Research, Section B, Volume 261, Issues 1-2, pp 755-759 August 2007.
12. Halvorsen, P., Das, I., Fraser, M., Freedman, D., Ibbott, G., **Parsai, E.I.**, Rice, R., Robin, T., Thomadsen, B.; Effective Peer Review for Clinical Radiation Oncology Physicists: AAPM Task Group 103 Report; Journal of Applied Clinical Medical Physics, Vol. 6, No. 4, pp 50-64, Fall 2005.
11. Ye, S.J., **Parsai, E.I.**, and Feldmeier, J.J., Dosimetric Characteristics of a Linear Array of Gamma or Beta Emitting Seeds in Intravascular Irradiation: Monte Carlo Studies for the AAPM TG-43/60 Formalism. Med. Phys. 30 (3), pp 403-415, March 2003.
10. Serpen, G., Iyer, R., Elsamaloty, H.M., **Parsai, E.I.**; Automated Lung Outline Reconstruction in Ventilation-Perfusion Scans Using Principal Component Analysis Techniques. Computers in Biology and Medicine, Vol. 33, issue 2, pp 119-142, March 2003.

9. McDonough, M.J., Feldmeier, J.J., **Parsai, E.I.**, Dobelbower, R.R., and Selman, S.H., Salvage External Beam Radiotherapy For Clinical Failure After Cryosurgery For Prostate Cancer, Int. J. Radiation Oncology Biol. Phys., Vol. 51, No. 3, pp 624-627, 2001.
8. Carter D.A., **Parsai, E.I.**, Ayyangar, K.M.; Accuracy of Magnetic Resonance Imaging Stereotactic Coordinates with the Cosman-Roberts-Wells Frame; Stereotactic and Functional Neurosurgery; 72, 35-46, 1999. (**Our Figure 3-c was used for the cover of this issue.**)
7. **Parsai, E.I.**, Ayyangar KM, Dobelbower, R.R., and Siegel, J.A., Clinical Fusion of Three-Dimensional Images Using Bremsstrahlung SPECT and CT, j Nucl Med, 38: 319-324. 1997.
6. Sen A, **Parsai EI**, McNeeley SW and Ayyangar KM, Quantitative Assessment of Beam Perturbations Caused by Silicone Diodes Used for In-vivo Dosimetry; Int. J. Radiation Oncology Biol. Phys., Vol. 36, No. 1, pp 205-211, 1996.
5. Ayyangar KM, **Parsai EI**, Chan MF, Sen A, Cao Y, Price RA, Saw CB, "Surface Region Electron Dosimetry in the Presence of Cerrobend Cutouts"; Journal of Medical Physics; Vol 21-4, 189-195, 1996.
4. **Parsai, E.I.**, Ph.D. Dissertation, "Three Dimensional Dosimetric Analysis And Quantitative Bremsstrahlung Spect Imaging For Treatment of Non-Resectable Pancreatic Cancer Using Colloidal Phosphorus-32", Medical University of Ohio, Toledo, Ohio, 1995.
3. **Parsai EI**, Ayyangar KM, Bowman D, Dobelbower RR, "3-D reconstruction of Ir-192 implant dosimetry using an appliance constructed for irradiating gingival carcinoma of alveolar ridge of mandible"; Oral Surg Oral Med, Oral path, Oral Radiol Endod;79:787-92, 1995.
2. **Parsai, EI**, Thesis for Master of Science in Medical Physics, "Acceptance testing and Commissioning of a 1.5 Tesla MRI Unit", University of Missouri, Columbia, Mo., 1985.
1. **Parsai EI**, Jean YC, "Study of temperature dependence of positron annihilation characteristics on the surfaces of Graphite powders"; Appl Phys A, 45, 11-1984.

B. PUBLISHED CONFERENCE PROCEEDINGS:

16. Jin, X., Shvydka, D., and **Parsai, E. I.**, Assessing large area thin-film CdTe material for diagnostic x-ray detection; Proceeding of the IOMP WC 2012, Beijing, China, May 2012.
15. Kang, J., Shvydka, D., **Parsai, E.I.**, Portal Sensor Based on Thin-Film CdTe: Feasibility Study For Clinical High Energy X-Ray Detection; Proceedings of the 10th International Workshop EP12K8, Electronic Portal Imaging & Positioning Device, San Francisco, CA, pp 64-65, May 20-22, 2008.
14. Riazi, R., Oghabian, M.A., **Parsai, E.I.**, Aghili, M., Jaberi, R.; Phantom Study on the Feasible and Reproducible Use of Digitally Reconstructed Radiograph (DRR) for Verification of Brachytherapy Treatment Planning; Proceedngs of the Iranian Radiological Sciences Association (IRSA) congress, Tehran, January 18, 2007.
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E. OTHER NON-PEER REVIEWED ARTICLES PUBLISHED:

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27. **Parsai, E. I.**, Hendee, W, and Pipman, Y.; Report of the IOMP delegate, International Congress of Medical Physics in Brazil Report; Vol 36, #4, pp 33-34, July/August 2011
26. **Parsai, E.I.**, Invitation to Medical Physicists, ACMP Newsletter third edition, pp 26-27, 2009.
25. **Parsai, E. I.**, Frey, D., and Hendee, W; Report of the IOMP delegate, [News from the IOMP World Congress](#), Munich, Germany, September 7-11, 2009; Vol 34, #6, pp 18-19, Nov/Dec 2009
24. **Parsai, E.I.**, Editor’s Choice; Medical Physics World (MPW), Bulletin of International Organization of Medical Physics (IOMP); MPW 25(2); pp(12-13), Dec. 2009.
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14. **Parsai, E.I.**, Reducing Errors in Radiation Therapy; Medical Physics World (MPW), Bulletin of International Organization of Medical Physics (IOMP); MPW 21(2); pp(17-19), Dec. 2005. (**Circulation of MPW is 16500 in 76 adhering member countries**).
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6. **Parsai, E.I.**, Recent Advances in Breast Cancer, Part II; Asheghaneh; 19th yr; No. 222; pp(84-88); Oct. 2003.
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4. **Parsai, E.I.**, Editor's Corner; Medical Physics World (MPW), Bulletin of International Organization of Medical Physics (IOMP); MPW 19(1); pp(4 & 6-7), June 2003.
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F. PAPER PRESENTATIONS (ORALS) AND POSTER SESSIONS:

65. Lavvafi, Hossein, Elahinia, Mohammad, **Parsai, E.I.**; “Reducing Radiation Exposure to the Rectum during Prostate Cancer Radiation Therapy using NiTi Shape Memory Alloy”; Presented at TMS Annual Meeting & Exhibition: Third Pan American Materials Congress: Advanced Manufacturing, Session: Polymer, Composites, and Metals; San Diego Convention Center and Marriott Marquis & Marina, San Diego, CA., February 26 – March 2, 2017.
64. Lavvafi, H Parsai, S Jahadakbar, A Tiwari, A Elahinia, M Devabhaktuni, V and Parsai E, “An Innovative Rectal Repositioning Device for Radiotherapy Applications of Pelvic Cancer: Design Methodology and Simulation Studies”, AAPM annual meeting, Denver, CO., July 30 - August 3, 2017.
63. Warell, G., Shvydka, D., and **Parsai, E.I.**; Quantitative Evaluation of the Thermal and Dosimetric Properties of a Ferrite-Based Thermo-Brachytherapy Seed; Presented at the Penn-Ohio Chapter of AAPM meeting, Cranberry Township, Pennsylvania, Oct. 2016.
62. Lavvafi, H, Parsai E.I., and Elahinia, M, “A Novel Approach for Sparing Critical Organs at Risk for Cancer Patients Undergoing Radiation Oncology Treatments,” Ohio Reviver Valley Chapter of AAPM, Spring Meeting, Springfield, OH., April 15-16, 2016.
61. Lavvafi, H, Tiwari, A, Jahadakbar, A, Elahinia, M, Devabhaktuni, V, and Parsai E.I., “Rectal Dose Sparing During Prostate Cancer Radiotherapy Employing Nitinol Shape Memory Alloy”, Ohio River Valley Chapter of AAPM Fall Meeting, Columbus, OH., November 11-12, 2016.
60. Shvydka, D., McCulloch, J., Warrell, G., **Parsai, E.I.**, and Karpov, V.; Accelerated Growth of Metal Whiskers under High Energy Electron Beam Irradiation; Presented at 2016 Materials Research Society (MRS) Spring Meeting, Phoenix, AZ, March 28-April 1, 2016.
59. McCulloch, J., Niraula, D., Grice, C., Warrell, G., Vasko, A., Irving, R., Georgiev, D., Borra, V., Karpov, V.G., **Parsai, E.I.**, and Shvydka, D.; Electric Field Stimulated growth of Zn and Sn whiskers; Submitted to the 9th International Symposium on Tin Whiskers to be held in Essen, Germany, Oct 13-15, 2015. (Presentation available through National tin whiskers teleconference database at http://www.dbicorporation.com/9thTinWhisk_UT_rev5.pdf).
58. Tanny, S., and **Parsai, E.I.**; Forward Scatter Factors from Concrete for the purposes of Radiotherapy Shielding; Submitted to the ORVC Spring Meeting Held in Oxford, Ohio, April 11-13, 2014.
57. Siebert, M. W., **Parsai, E. I.**; Collision Avoidance Charts for Varian TrueBeam Linac and Exact IGRT Couchtop and Gantry with Various Lateral and Vertical Couchtop Positions; Submitted to the ORVC Spring Meeting Held in Oxford, Ohio, April 11-13, 2014.
56. Macey, N.J., Shvydka, D., **Parsai, E.I.**; Evaluation of a Diode Array for High Dose Rate Brachytherapy Quality Assurance; Submitted to the ORVC Spring Meeting Held in Oxford, Ohio, April 11-13, 2014.

55. Leheta, D., Shvydka, D., and **Parsai, E.I.**; Acquisition and analysis of megavoltage Linac beam transmission data for direct verification of photon spectra models in a treatment planning system. Submitted to the ORVC Spring Meeting Held in Oxford, Ohio, April 11-13, 2014.
54. Tanny, S., Pearson, D., Hancock, G., and **Parsai, E.I.**; Small Field Electron Beam Dosimetry Using Solid State Detectors on the Surface and in the Build-Up Region; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
53. Sperling, N.N., **Parsai, E.I.**; A model for the simulation of EPID measurements in the BeamNRC Monte Carlo package; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
52. Soni, N., Shvydka, D., and **Parsai, E.I.**; Measurement of attenuation for the new titanium Fletcher-Suit-Delclos Applicator using Monte Carlo Simulation Verified by Measurements; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
51. Paudel, N., Shvydka, D., and **Parsai, E.I.**; Study of Dose Enhancement due to Gold Nanoparticles Using 3-D Gel Micro-Dosimetry; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
50. Hancock, G., Pearson, D., and **Parsai, E.I.**; Development of a Comprehensive Linac-based Quality Assurance Procedure for a retrofitted Micro-MLC SRS System. Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
49. Gautam, B., Shvydka, D., and **Parsai, E. I.**; Technical Aspects of the Newly Designed Ferromagnetic Core Thermo-brachytherapy Seed. Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Ohio State, Columbus, Ohio, March 2012.
48. **Parsai, E.I.**; Errors in Radiation Therapy – Root Cause Analysis, Mitigation Steps and Outcomes, US Examples”, invited talk at the 18th International Conference on Medical Physics, Science and Technology for Health for All (ICMP-2011) held in Porto Alegre Brazil, April 15-20, 2011.
47. Rhodes, C., **Parsai E. I.**; An Automated Program for Shielding Calculation of a Radiotherapy Vault; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2011.
46. White, T., Shvydka, D., and **Parsai, E.I.**; A Novel Device for Delivering Partial Breast Hyperthermia Concurrent with Partial Breast Irradiation; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2011.
45. Jin, X., Shvydka, D., and **Parsai, E. I.**; Intrinsic characteristics study for optimal thickness of thin film CdTe under diagnostic x-ray beams; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2011.

44. Gautam, B. R., Shvydka, D., Feldmeier, J, J. and **Parsai, E. I.**; Advantages of Implementation of a Self-regulating Thermobrachytherapy Seed in Treatment of Solid Tumors. Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2011.
43. Gautam, B. R. Shvydka, D., **Parsai, E. I.**, and Feldmeier, John, J.; Investigating Thermal Properties of a Ferromagnetic Thermosteeds for Thermobrachytherapy Using COMSOL Multiphysics.; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2010.
42. Jin X., **Parsai E.I.**, and Shvydka D.; Thin film CdTe photovoltaic detector performance under diagnostic X-ray beams; Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2010.
41. Detwiler J., Pearson D., & **Parsai, E.I.**; Dosimetric Comparison of Three Multi-Lumen Brachytherapy Applicators with the Original MammoSite® Balloon Used in Partial Breast Irradiation (PBI); Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, March 2010. (This paper was judged as the **second winner** in this region's competition and she won in addition to a certificate, a **monitory prize of \$400.00**).
40. Khan, N., **Parsai, E.I.**, Feldmeier, J.J.; Concurrent Delivery of Interstitial ThermoBrachytherapy (Hyperthermia and Brachytherapy) in the Treatment of Cancer; Presented at the Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, May 2008.
39. Kang, J., **Parsai, E.I.**, Shvydka, D.; A New Generation of Electronic Portal Imaging Devices (EPID) Using Thin-Film CdTe for Radiation Oncology Applications; Presented at the Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, May 2008.
38. Carroll, T.M., **Parsai, E.I.**, Feldmeier, J.J.; Monte Carlo Neutron Shielding Evaluation of Treatment Vaults Built to NCRP 49 or NCRP 151 Recommendations Presented at the Spring Meeting of the Ohio River Valley Chapter of the AAPM Meeting; Cincinnati, Ohio, May 2008.
37. Kang, J., **Parsai, E.I.**, Shvydka, D.; New Generation Portal Sensor Based on Thin-Film Cadmium Telluride for Clinical High Energy X-Ray Imaging; Accepted as a finalist for the YOUNG INVESTIGATOR'S COMPETITION during the 25th Annual Meeting of the American College of Medical Physics, Seattle, WA from May 3 – 6, 2008.
36. **Parsai, E.I.**; Compare & Contrast the IMRT Dose Delivery techniques using MLC vs. Solid Compensators. Advantage & disadvantages of IMRT vs. IMAT; ASRT annual meeting, Los Angeles, CA., October 2007.
35. Khadija, M., **Parsai, E.I.**, Feldmeier, J.J.; Comparative analysis between multi-leaf IMRT and Solid State IMRT Radiation Delivery, a Five Year Retrospective Study; presented at the Ohio River Valley Chapter (ORVC) meeting of the AAPM; April, 28th, 2007

34. Zhengdong, Z., **Parsai, E.I.**; A Monte Carlo Study Verified by Measurement of Dose Attenuation from Fletcher-Suit-Delclos (FSD) Due to Stainless Steel tube for HDR Brachytherapy Applications; presented at the Ohio River Valley Chapter (ORVC) meeting of the AAPM; April, 28th, 2007
33. Kang, Jun, **Parsai, E.I.**, Shvydka, Diana; A New Generation of Electronic Portal Imaging Detectors (EPID) Based on CdTe for Radiation Oncology Applications; presented at the Ohio River Valley Chapter (ORVC) meeting of the AAPM; April, 28th, 2007
32. **Parsai, E.I.**, Khadija, Murshed, and Feldmeier, J.J.; “Dosimetric Analysis of Absorbed Dose outside the Target Volume in IMRT Delivery Using Tungsten Leaflets as Compared to Solid Compensating Filters”; Penn-Ohio River Valley Chapter of the AAPM annual meeting; 2006 Fall Symposium, Sheraton Hotel, Mars, PA, September 29-30, 2006.
31. **Parsai, E.I.**, “New Innovations and Advances in Radiation Oncology”, A CEU event for 1.5 credits of continuing education through Medical University of Ohio; Presented at an Oncology Team Meeting to Physicians, Nursing, and other Medical Staff at the Community Hospitals and Wellness Center in Bryan, Ohio. January 19, 2006.
30. **Parsai, E.I.**, Dobelbower, R.R., Feldmeier, J.J., “An Overview of the Physics and Dosimetry of Beveled Applicators in IORT Treatments.” Medical University of Ohio, Toledo Radiation Oncology Group (TRO) in-service. November 2005.
29. **Parsai EI**, Ye SJ - “Clinical Verification of the New 0.5 cm Length Ir-192 Varisource for High Dose Rate Brachytherapy”. Paper Presentation. Annual meeting of the Ohio River Valley Chapter (ORVC) of the AAPM, Columbus, OH, April 28, 2001.
28. Ye SJ, **Parsai EI** – “Broadening of Dose-Window in Coronary Artery Irradiation with a Linear Array of G- or B-Emitter Seeds for Intravascular Brachytherapy: Why or Why Not AAPM TG-43”. Paper Presentation. Annual meeting of the Ohio River Valley Chapter (ORVC) of the AAPM, Columbus, OH, April 28, 2001.
27. Ye, S.J., **Parsai, E.I.**, Choi, .K. “Dose non-uniformity in a curved treatment geometry of IVBT using an array of beta-or gamma-emitting seeds so called curvature effect,” *Cardiovascular Radiation Therapy V Meeting*, Washington, DC, February 17, 2001.
26. **Parsai, E.I.**, The Role of High Dose Rate Remote Afterloading (HDR) in Management of Cancer Patients. 59th Annual Meeting of The Ohio Society of Radiologic Technologists; Toledo, Ohio April 16-18, 1999.
25. **Parsai, E.I.**; The Importance of CT Scanning in 3D Conformal Radiotherapy; **An Invited Paper** by The Specialized Topics in Areas of Radiologic Sciences (STARS) Association; A Radiation Therapy Conference; December 5, 1998.
24. **Parsai, E. I.**, Ayyangar, K. M. and Carter, D. A.; Accuracy of MRI Stereotactic Coordinates With The Cosman-Roberts-Wells (Crw) Frame, ASTRO Annual Meeting, Phoenix, Az., October 25-29, 1998.

23. **Parsai, E. I.**; The Physics of Stereotactic Radiotherapy; **An Invited Paper** for The Medical University of Ohio's "What's New" Conference Sponsored by the State of Ohio Neurosurgery Nursing Organization; October 24, 1998.
22. Ayyangar, K.M., Jiang, S.B., **Parsai, E.I.**, Dobelbower, R.R., Feldmeier, J.J., Battle, J.A., Brown, J., Carter, D.; A Comparison of Monte Carlo and Conventional Treatment Planning for LINAC Based Stereotactic Radiosurgery. 58th Annual Meeting of the Ohio State Radiological Society, Cuyahoga Falls, OH. May 2, 1998
21. Badkul, R.K., **Parsai, E.I.**, Battle, J.A., Dobelbower, R.R., Feldmeier, JJ, Price, R., Bin Jiang, S., and Ayyangar, K.M.; Comparative Analysis of Four Field and Cross Fire Conformal 3D Techniques For Prostate Treatment Under the Influence of Simulated Prostate Motion and Setup Errors; 18th Annual Conference on Medical Physics, Ludhiana, India, Nov. 13-15, 1997.
20. **Parsai, E.I.**, P-32 SPECT Imaging In Treatment Of Non-Resectable Pancreatic Cancer. **Invited Paper.** Northwest Ohio Imaging Society, Second Conference on Nuclear Medicine, Toledo, Ohio, Feb. 1997.
19. Ayyangar, K.M, **Parsai, E.I.**, CT-MR, New Water Filled MRI Localizer Test. Annual meeting of AAPM, works in progress; WIP-H-02, July 1996.
18. **Parsai, E.I.**, Ayyangar, K.M., Siegel, J.A. and Dobelbower, R.R., A Practical Technique for 3-D Absorbed Dose Calculation for Patients Receiving Infusional Colloidal P-32 Using Images Obtained from Bremsstrahlung SPECT; Annual meeting of AAPM, works in progress; WIP-Q-05, July 1996.
17. **Parsai, E.I.**; Applications of Bremsstrahlung SPECT Imaging in Treatment of Non-resectable Pancreatic Cancer Using Colloidal P-32, **Invited paper** in the Central Ohio Society of Nuclear Medicine Technologists (COSNMT), Columbus, Ohio, June 22, 1996.
16. Ayyangar, K.M., **Parsai, E. I.**, Carter*, D. A., And Dobelbower, R.R., Evaluation of the New Water-Filled BRW MRI Localizer Utilized for Stereotactic Radiosurgery, Annual meeting of the AAPM; Works in Progress, July 1996.
15. K.M. Ayyangar, **E.I. Parsai**, R.R. Dobelbower, and J.A. Siegel; Three-dimensional Quantitative Dosimetry of Colloidal Phosphorus-32 using Images Obtained from Bremsstrahlung SPECT; Society of Nuclear Medicine, 43rd annual meeting; Denver, Colorado, June 3-6 1996.
14. **Parsai EI**, Ayyangar KM, Dobelbower RR, and Siegel JA; Three-dimensional Dose-Volume Histogram (DVH) Analysis for Bremsstrahlung SPECT Images Obtained by Infusional Brachytherapy Using Phosphorus-32; 6th international radiopharmaceutical dosimetry symposium.Gatlinburg, Tennessee, pp 18-19, May 1996.
13. Ayyangar KM, **Parsai EI**, Price, RA, Pawlicki, T, Dobelbower, RR, Konski, A; Application of NTCP in the evaluation of 3-D treatment plans of a recurrent lung cancer - A case study, Northwestern Ohio Radiology Oncology Society (NWOROS) meeting; Jan. 1996.

12. **Parsai, EI**, Three-dimensional dosimetric analysis and quantitative bremsstrahlung SPECT imaging for treatment of non-resectable pancreatic cancer using colloidal P-32, Gershenson Radiation Oncology Seminar, Harper Hospital (Wayne State University), Jan. 12, 1996.
11. **Parsai, E.I**, Ayyangar KM, Dobelbower, R.R., and Siegel, J.A., A Practical Technique for Clinical Fusion of Three-dimensional Images Obtained by Bremsstrahlung SPECT and CT, Fall 1995 meeting of the Ohio River Valley Chapter of AAPM, Nov 11, 1995.
10. K.M. Ayyangar, R.R. Dobelbower, **E.I. Parsai**, R. Price, T. Pawlicki and J. A. Battle; Clinical Implementation / implications of Conformal Therapy at The Medical University of Ohio; Presented in the International Conference in Medical Physics Meeting held in India; 11-1995.
9. **Parsai EI**, Ayyangar KM, Chan MF, Carter DA, Studies on MRI Distortion for Radiosurgery, Using CT-MRI, 55th annual meeting of the Ohio State Radiological Society; May 5-7 1995.
8. Sen A, **Parsai EI**, McNeeley SW and Ayyangar KM, Reduction of Patient Dose Through the Introduction of Diodes for In-vivo Dosimetry of Photon and Electron Beams; 55th annual meeting of the Ohio State Radiological Society; May 5-7 1995.
7. Ayyangar KM, **Parsai EI**, Chan MF, Dobelbower RR, Mange PS, McNeeley SW, Pawlicki T, Price RA and Sen A, Stereotactic Radiosurgery for Single and Multi-Isocenter Treatment with Optimization and Automated Techniques; 55th annual meeting of the Ohio State Radiological Society; May 5-7 1995.
6. Dobelbower RR, **Parsai EI**, Price RA and Ayyangar KM, 3D Analysis of Treatment Techniques for Prostate Cancer, 55th annual meeting of the Ohio State Radiological Society; May 5-7 1995.
5. **Parsai EI**, Ayyangar KM, Three Dimensional Dosimetry Analysis and Quantitative Bremsstrahlung SPECT Imaging Using Colloidal Phosphorus-32 In Treatment Of Non-Resectable Pancreatic Cancer". Poster presentation at the tenth annual graduate student research forum; April 17-21, 1995.
4. Ayyangar, KM, **Parsai E I**, Cao Y, Chan MF, Sen A, Price RA, "Conformal therapy for a brain stem glioma"; AAPM meeting, July 1994.
3. **Parsai E I**, Ayyangar KM, Bowman D, Dobelbower RR, "3-D reconstruction of Ir-192 implant dosimetry using an appliance constructed for irradiating gingival carcinoma of alveolar ridge of mandible"; **Guest Speaker** on 54th annual meeting of the Ohio State Radiological Society meeting (OSRS); May 5-8,1994.
2. **Parsai EI**, Jean YC. "Measurement of Compton Profile of both oriented single crystals and isotropic specimens of amorphous solids and powders". Presented at the Midwest Region Solid State Conference; August 1984.
1. **Parsai EI**, Jean YC. "Study of adsorption phenomenon, using positron lifetime technique". Presented in Mid West Region Solid State Conference; Oct. 1983.

APPENDIX I

Detail list of Dissertations and MS thesis Topics of Students

Major Advisor to the Following Current Graduate Students:

1. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Bogue, Jonathan
2. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Kanru Xie
3. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Madan Mainali
4. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Elahheh Salari
5. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Somayeh Taghizadeh G.
6. Ph.D.; UT – Physics Department; Radiation Oncology Physics; Fatemeh Akbari

Interim Advisor to the Following Students:

1. M.S.; UT - HSC Radiation Oncology Physics; Langmack, Christian
2. M.S.; UT - HSC Radiation Oncology Physics; Vanwell, Tyler
3. M.S.; UT - HSC Radiation Oncology Physics; Oakey, Mary
4. M.S.; UT - HSC Radiation Oncology Physics; Balyimez, Serkan

Major Advisor to the Following Students (GRADUATED):

1. **August 2018; Jack Davies, M.S.**; UT - HSC Radiation Oncology Physics; “Determination of Isocentric Offset as a Function of Beam Energy and Commissioning of EDWs for the Treatment Planning System RayStation”.
2. **August 2017; Jui Wan, M.S.**, UT - HSC Radiation Oncology Physics; “Exploring RayStation Treatment Planning System: Commissioning Varian True Beam Photon and Electron Energies, and Feasibility of Using FFF Photon Beam to Deliver Conventional Flat Beam”.
3. **August 2017; Chenguang Liu, M.S.**, UT - HSC Radiation Oncology Physics; “Dosimetric Evaluation and Verification of Respiratory Motion Management System in Radiation Oncology”.
4. **May 2017; Hossein Lavvafi, M.S.**, UT - HSC Radiation Oncology Physics; “Reducing Radiation Exposure to the Rectum during Prostate Cancer Radiation Therapy using NiTi Shape Memory Alloy”.
5. **May 2016; Ramzi Ajo, M.S.**, UT - HSC Radiation Oncology Physics; “A Dosimetric Evaluation of The Eclipse and Pinnacle³ Treatment Planning Systems in Treatment of Vertebral Bodies using IMRT and VMAT with Modeled and Commissioned Flattening Filter Free (FFF) Fields”.
6. **July 2016; Mamdooh Alarady, M.S.**, UT - HSC Radiation Oncology Physics; “Characterization of Image Quality between Multi-Slice Computed Tomography and Cone Beam Computed Tomography for Clinical Used Protocols in Radiation Therapy Treatment Planning”.
7. **July 2016; Kyle Luttrell, M.S.**, UT – HSC Diagnostic Imaging Physics; “An Investigation of Dose Reduction in Head and Neck CT with the Use of Organ Exposure Modulation”.
8. **July 2016; Abdullah Aldokhail, M.S.**, UT – HSC Diagnostic Imaging Physics; “Developing an Automated Method to Measure SNR for MRI with High Accuracy and Reproducibility”.

9. **May 2016; Maram Alsanea, M.S.,** UT – HSC Diagnostic Imaging Physics; “The Effects of Metal on Size Specific Dose Estimation (SSDE) in CT: A Phantom Study”.
10. **December 2015; Bejarano-Buele, Ana, M.S.,** UT - HSC Radiation Oncology Physics; “Comparison of Radiation Treatment Plans for Breast Cancer between 3D Conformal in Prone and Supine Positions in Contrast to VMAT and IMRT Supine Positions”.
11. **December 2015; Sean Tanny, Ph.D.;** UT – HSC Radiation Oncology Physics; “Investigation of Radiation Protection Methodologies for Radiation Therapy Shielding Using Monte Carlo Simulation and Measurement
12. **July 2015; Haitham Alahmad, M.S.,** UT – HSC Diagnostic Imaging Physics; “Evaluation of Phantoms Used in Image Quality Performance Testing of Dental Cone Beam Computed Tomography Systems”.
13. **July 2014; Michael Dance, M.S.;** UT - HSC Radiation Oncology Physics; “A Comparative Analysis for Verification of IMRT and VMAT Treatment Plans using a 2-D and 3-D Diode Array”.
14. **December 2013; Nicholas Sperling, Ph.D.;** UT – HSC Radiation Oncology Physics; “A Novel Algorithm for the Reconstruction of an Entrance Beam Fluence from Treatment Exit Patient Portal Dosimetry Images.
15. **June 2013; Justin Walker, M.S.;** UT - HSC Radiation Oncology Physics; “The Use of an On-Board MV Imager for Plan Verification of Intensity Modulated Radiation Therapy and Volumetrically Modulated Arc Therapy”.
16. **September 2013; Nichole Hill, M.S.;** UT – HSC Radiation Oncology Physics; “Dosimetric Verification of Respiratory-Gated Radiation Therapy using a Dynamic Phantom for Commissioning the Varian Real-Time Position Management System”.
17. **May 2013; Bhoj Gautam, Ph.D.;** UT – HSC Radiation Oncology Physics; “Study of Dosimetric and Thermal Properties of a Newly Developed Thermo-brachytherapy Seed for Treatment of Solid Tumors”.
18. **October 2012; Neelu Soni M.S.;** UT - HSC Radiation Oncology Physics; “Quantitative Assessment of the Source Attenuation for the New CT-compatible Titanium Fletcher-Suit-Delclos (FSD) Gynecologic Applicator”.
19. **August 2011; Todd S. White, M.S.;** UT - HSC Radiation Oncology Physics; “A Novel Device for Delivering Combined Partial Breast Irradiation and Partial Breast Hyperthermia”.
20. **August 2011; Charles Rhodes, M.S.;** UT-HSC Radiation Oncology Physics; “Development of an Automated Program for Calculating Radiation Shielding in a Radiotherapy Vault”.
21. **June 2011; Xiance Jin, Ph.D.;** UT-HSC Radiation Oncology Physics; “Evaluation of Large Area Polycrystalline CdTe Detector for Diagnostic X-ray Imaging”.
22. **December 2010; Brian Bismack, M.S.;** UT-HSC Radiation Oncology Physics; “Implementation of the Dosimetry Check Software Package in Computing 3D Patient Exit Dose Through Generation of a Deconvolution Kernel to be Used for Patients’ IMRT Treatment Plan QA”. Brian was the **winner of the 2010 ACMP Graduate Student Award**.
23. **December 2010; Andrea Herrick, M.S.;** UT-HSC Radiation Oncology Physics; “A Comparative Dosimetric Analysis of the Effect of Heterogeneity Corrections Used in Three Treatment Planning Algorithms”.
24. **August 2010; Jalpa Patel, M.S.;** UT-HSC Radiation Oncology Physics; “Commissioning, Acceptance Testing, and Implementation of an EPID Based IMRT QA System “Dosimetry Check” and Quantitative Comparisons with Map Check”.

25. **August 2010; Joseph Pichler, M.S.;** UT-HSC Radiation Oncology Physics; “IMRT Plan Delivery Verification Utilizing a Spiral Phantom with Radiochromic Film Dosimetry”.
26. **September 2010; Ian Gordon, M.S.;** UT-HSC Radiation Oncology Physics; “Feasibility Study of Intensity Modulation for Low Dose Rate External Beam Radiation Therapy”.
27. **September 2009; Joshua Heck, M.S.;** UT-HSC Radiation Oncology Physics; “Development and Implementation of Quality Assurance Standards for External Beam Intensity Modulated Radiation Therapy”.
28. **September 2009; Murshed Khadija, M.S.;** UT-HSC Radiation Oncology Physics; “A Clinical Comparison and Analysis Between Conventional MLC Based and Solid Compensator Based IMRT Treatment Delivery Techniques”.
29. **June 2009; ZhengDong Zhang, Ph.D.;** UT-HSC Radiation Therapy Physics; “Quantitative Assessment of Radiation Dosimetry from a MammoSite balloon, FSD Applicator and a Newly Designed HDR Applicator for Treatment of GYN Cancers Using Monte Carlo Simulations”. An abstract of one of this student’s dissertation submitted to ASTRO received the **ASTRO’s First Place Award** for Poster Viewing Session.
30. **December 2008; Timothy Michael Carroll, M.S.;** UT-HSC Radiation Therapy Physics; “Calculation of the Tenth Value Layer of 5% Borated Polyethylene for the Neutron Spectrum Emitted From An 18 MV Elekta Accelerator Head and for the Neutron Spectrum Found at the Entrance of A Treatment Room Maze”.
31. **December 2008; Nadeem Khan, M.S.;** UT-HSC Radiation Therapy Physics; “Dosimetric Calculation of New Thermobrachytherapy Seed Models: A Monte Carlo Study”.
32. **November 2008; Jun Kang, Ph.D.;** UT Department of Physics and Astronomy – Medical Physics; “Thin film CdTe as high energy x-ray detector material for medical applications”.
33. **December 2008; David Pearson, Ph.D.;** UT Department of Physics and Astronomy – Medical Physics; “Evaluation of Dosimetric Properties of 6 MV & 10 MV Photon Beams From a Linear Accelerator with no Flattening Filter”.
34. **May 2008; Peter Thirunelliparambil, M.S.;** UT-HSC Radiation Therapy Physics; “Segmented Electron Arc Therapy: Physical Measurement and Calibration Techniques”.
35. **July 2008; Jacob Bugno, M.S.;** UT-HSC Radiation Therapy Physics; “Development and Implementation of a GafChromic[®] EBT In-Vivo Dosimetry System”.
36. **August 2008; Brandon Merz, M.S.;** UT-HSC Radiation Therapy Physics; “Dosimetric Comparison of Superficial X-Rays and a Custom HDR Surface Applicator for the Treatment of Superficial Cancers.”.
37. **August 2005; Chetan Patel, M.S.;** UT - HSC Radiation Oncology Physics; “Thesis topic”, (Did not complete his thesis).
38. **November 2007; Phil Chan, M.S.;** UT-HSC Radiation Therapy Physics; “Dosimetric Verification of the ADAC Pinnacle³ Pencil Beam Algorithm for Clinical Electrons In Presence of Cerrobend Blocking”.
39. **July 2006; Julie DeAnna, M.S.;** UT-HSC Radiation Therapy Physics; “Commissioning Enhanced Dynamic Wedges on a Varian 2100 C/D machine”.
40. **March 2006; Todd Hill, M.S.;** UT-HSC Radiation Therapy Physics; “Neutron Fluence Measurements of the Siemens Oncor Linear Accelerator Utilizing Gold Foil Activation”.
41. **August 2004; Ian Reinick, M.S.;** MCO Radiation Therapy Physics; “Retrospective Study of 180 Patients Receiving IORT as Part of Their Adjuvant Therapy”. (Ian never defended his thesis).

42. **August 2005; Bishwa Aryal, M.S.;** UT-HSC Radiation Therapy Physics; “Evaluation of Scatter Distribution through Segmented IMRT Fields in Treatment of Head and Neck Cancer”.
43. **August 2005; Chul Lee, M.S.;** MCO Radiation Therapy Physics; “Acceptance Testing, Beam Modeling and Commissioning of 10 MV and 18 MV Photon Beams For Radiation Oncology Applications”.
44. **August 2005; Kalyan Adhikary, M.S.;** MCO Radiation Therapy Physics; “Development of Software Tools and D-Base for Radiation Oncology Clinical Applications”.
45. **August 2004; Jun Li, Ph.D.;** UT/MCO Radiation Therapy Physics; “Analysis of Dose Characteristics From Beveled Applicators in Intra-operative Radiation Therapy (IORT) Using Monte Carlo Simulation, Water Scan Measurement and Film Dosimetry.”
46. **August 2004; Chen Chen, M.S.;** MCO Radiation Therapy Physics; “A Technique to Measure and Compensate For Prostate Movement for Patients Receiving Daily IMRT Treatment Using BAT System Compared With EPID”.
47. **August 2003; Abhinit Priyadershi, M.S.;** MCO Radiation Therapy Physics; “Comparative Analysis In Calibration Of Superficial X-Ray Therapy Unit Using Various Ionization Chambers”.
48. **August 2002; Mahesh Gopalakrishna, M.S.;** MCO Radiation Therapy Physics; "Measurement and Analysis of Surface Dose and Buildup Region for Photons and Electrons on the Varian Clinac 1800".
49. **August 2002; Ali Alkaissi, M.S.;** MCO Radiation Therapy Physics; “Evaluation of P-32 Chromic Phosphate for Adjuvant Treatment of Prostate Cancer with External Radiation Therapy”.
50. **June 2002; Ronald Froehlich, M.S.;** MCO Radiation Therapy Physics; "Measurement and Analysis of Surface Dose and Buildup Region for Photons and Electrons on the Varian Clinac 1800".
51. **August 2001; Craig Payette, M.S.;** MCO Radiation Therapy Physics; “Evaluation of P-32 Chromic Phosphate for Adjuvant Treatment of Prostate Cancer with External Radiation Therapy”.
52. **June 2000; Godwin Dorbu, M.S.;** MCO Radiation Therapy Physics; "Implementation of AAPM'S TG-51 Protocol in Clinical Reference Dosimetry".

COMMITTEE MEMBER of the following graduated students::

1. **June 2018, Jeremy Kunz, M.S.,** UT - HSC Radiation Oncology Physics; “A Monte Carlo model of the Varian Edge Linear Accelerator Head Using MCNP: Small Field Output Factor Validation”.
2. **June 2018, Wesley Short, M.S.,** UT - HSC Radiation Oncology Physics; “Evaluating the Dosimetric Accuracy of Small Gating Windows in Radiotherapy”.
3. **June 2018, Justin Yates, M.S.,** UT - HSC Radiation Oncology Physics; “Retrospective Dosimetric Comparison of MLC Defined Conformal Arc to Stereotactic Cone Plans for Single Fraction SRS on the Varian Edge™.
4. **June 2017, Aleem Qureshi, M.S.,** UT - HSC Radiation Oncology Physics; “A Novel Equivalent Squares Formalism for use in Small Field Dosimetry”.
5. **June 2017, Jessica Muenkel, M.S.,** UT - HSC Radiation Oncology Physics; “An Evaluation of the Dose to the Spinal Cord for SBRT Spine Patients and the Role of MRIs”.
6. **June 2016, Zeynep Karakas, M.S.;** UT - HSC Radiation Oncology Physics; “Comparative Motion and Dosimetric Analysis of Organs at Risk near Pancreatic Tumors Treated with Stereotactic Body Radiation Therapy with and without Abdominal Compression using 4DCT Dataset”.
7. **June 2016, Gregory Warrell, Ph.D.;** UT – Department of Physics and Astronomy- Medical Physics Radiation Oncology; “Clinical Implementation of Thermobrachytherapy Seed, Theoretical and Experimental Measurements”.
8. **June 2015, Vincent Ulizio;** UT - HSC Radiation Oncology Physics; The Dosimetric Importance of Six Degree of Freedom Couch End to End Quality Assurance for SRS/SBRT Treatments when Comparing Intensity Modulated Radiation Therapy to Volumetric Modulated ARC Therapy”.
9. **June 2015, Fatima Alsharif, M.S.;** UT - HSC Radiation Oncology Physics; “The Dosimetric Effect of the MLC Leaf Width in ARC Therapy”.
10. **June 2015, Tara Gray, M.S.;** UT - HSC Radiation Oncology Physics; “The Limit of Resolution and Detectability of the ArcCHECK QA Phantom in small field Volumetric Modulated Arc Therapy and Stereotactic Radiosurgery Quality Assurance”.
11. **June 2015, Mathew Damien, M.S.;** UT - HSC Radiation Oncology Physics; “Polarity Effects from Vertically-Mounting Small Volume Ionization Chambers for Reference Dosimetry of Small-Fields”.
12. **June 2015, Nathaniel Macey, M.S.;** UT - HSC Radiation Oncology Physics; “Evaluation of a MapCHECK2 Diode Array for High Dose Rate Brachytherapy Quality Assurance”.
13. **June 2014, Nava Paudel, Ph.D.;** UT – Department of Physics and Astronomy- Medical Physics Radiation Oncology; “Nanoparticle-aided Radiation Therapy: Micro-dosimetry and Evaluation of the Mediators Producing Biological Damage”. **JACMP’s Award of Excellence in Best Measurement Paper in Radiotherapy in 2016.**
14. **December 2014, Dimitra Leheta, M.S.;** UT - HSC Radiation Oncology Physics; “Acquisition and Analysis of Megavoltage Linac Beam Transmission Data for Direct Verification of Photon Spectra Models in a Treatment Planning System”.
15. **June 2014, Sukhdeep Gill, M.S.;** UT - HSC Radiation Oncology Physics; “A Study of Evaluation of Optimal PTV Margins for Patients Receiving Prostate IGRT based on CBCT Data Dose Calculation”.
16. **June 2014, Adam Dalhart, M.S.;** UT - HSC Radiation Oncology Physics; “A Verification of Deformable Dose and Treatment Planning Software in the Evaluation of Dose to Targets and Normal Structures in SBRT Patients”.

17. **June 2013, Jason Hudson, M.S.;** UT - HSC Radiation Oncology Physics; “Image-Guided Adaptive Radiation Therapy: Retrospective Study and Assessment of Clinical Workflow”.
18. **June 2013, Craig Koontz, M.S.;** UT - HSC Radiation Oncology Physics; “Monte Carlo Investigation on the Effect of Heterogeneities on Strut Adjusted Volume Implant (SAVI) Dosimetry”.
19. **June 2013, David Davenport, M.S.;** UT - HSC Radiation Oncology Physics; “Development of A Quality Assurance Procedure for Dose Volume Histogram Analysis”.
20. **June 2013, Melissa A. Shomody, M.S.;** UT-HSC Occupational Health, Industrial Hygiene; “Dust Samplers Comparison: IOM Dual Sampler (Inhalable & Respirable) vs Conventional Methods for Assessing Welders Exposure to Manganese”.
21. **August 2012, George Hancock, M.S.;** UT-HSC Radiation Oncology Physics; “Development of a Comprehensive Linac-based Quality Assurance Procedure for a Retrofitted Micro-MLC SRS System”.
22. **August 2012, Eric Williamson, M.S.;** UT-HSC Radiation Oncology Physics; “Dose Modification Factor Analysis of Multi-Lumen Brachytherapy Applicator with Monte Carlo Simulation”.
23. **July 2012, Edward Dickerson, M.S.;** UT-HSC Radiation Oncology Physics; “Quantitative Analysis of the Head Scatter and Jaw Transmission Correction Factor for Commissioning of Enhanced Dynamic Wedge Fields Using a Map-CHECK 2 Diode Array”.
24. **July 2011, Stephanie Horne, M.S.;** UT - HSC Radiation Oncology Physics; “Dosimetric Analysis of Irregular Surfaces with the Leipzig and Valencia HDR Skin Applicators”.
25. **July 2010, Justin Sherman, M.S.;** UT – HSC Radiation Oncology Physics; “The Comparison of Dose Modification Factors for Two Multi-Lumen Brachytherapy Applicators used in Partial Breast Irradiation”.
26. **July 2010, Jordyn Detwiler, M.S.;** UT - HSC Radiation Oncology Physics; “Dosimetric Evaluation of Three Partial Breast Irradiation Devices and the Dosimetric Effect of Tissue Thickness Surrounding a Multi-Lumen Partial Breast Applicator”. Jordyn’s paper was submitted to the Ohio River Valley Chapter meeting of the AAPM and **received second place in the region.**
27. **July 2008, Dean Walton, M.S.;** UT-HSC Diagnostic Radiology Physics; “Effect of Slit Scan Imaging Technique on Image Quality in Radiotherapy Electronic Portal Imaging”.
28. **July 2004, Janaki Ram Prasad Earla, M.S.;** UT-HSC Diagnostic Radiology Physics; “The Assessment of the Effect of Cancer and Its Treatment on PET Scan F-18 FDG Tracer Distribution in Pre- and Post-Treatment and Its Relation to Myocardial Tissue Uptake.
29. **May 2004, Jan Martensen, Ph.D.;** UT-HSC Diagnostic Radiology Physics; " Assessment of Cervical Spine Morphology by Computed Tomography and Its Utility as a Presurgical Planning Tool”.
30. **April 2004, Goldie M. Bodiker, M.S.,** MCO Diagnostic Radiology Physics; “fMRI Analysis of Inverted and Non-inverted Left-handed Subjects During Language Tasks”.
31. **April 2004, Joseph T. Rakowski, Ph.D.;** MCO Diagnostic Radiology Physics; "Mammography Tomosynthesis Using A Coupled Source and Detector in A C-Arm Configuration".
32. **May 2000, Rama Iyer, M.S;** **UT Electrical and Computer Engineering;** "Neural PCA Network for Lung Outline Reconstruction in VQ Scan Images".

- 33. January 2000, Dillip K. Tekkedil, M.S.; UT Electrical and Computer Engineering;** "Diagnosis of Pulmonary Embolism Using Neural Networks".
- 34. May 2000, Yong Suk Choi, Ph.D.,** MCO Diagnostic Radiology Physics; "Computerized Analysis of Depth EEG of Human Hippocampus and Amygdala in Relation to Sleep Stages".
- 35. May 2000, Kerry T. Krugh, Ph.D.;** MCO Diagnostic Radiology Physics; "Tomographic Mapping of Functional Brain Activity Using a Multi-Session Dynamic Susceptibility Contrast MRI Approach".
- 36. January 2000, Vishwanath Acharya, M.S.; UT Electrical and Computer Engineering;** "Development of a Fuzzy Interface System for the Diagnosis of Pulmonary Embolism Using Ventilation-Perfusion Scan Images".
- 37. December 1999, Charles A. Giomuso, M.S.;** MCO Diagnostic Radiology Physics; "Evaluation of the Modified Vanderbilt Cardiac MUGA Phantom Using Current Gamma Camera Systems".
- 38. December 1999, Sadiq R. Malik, M.S.;** MCO Radiation Therapy Physics; "Comparison of Calculated Electron Beam Characteristics and Parameters at Extended SSDs and Field Sizes on VRS Treatment Planning System With Measurements Using Wellhofer Data-Acquisition System".
- 39. July 1999, Prakash Aryal, M.S.;** MCO Radiation Therapy Physics; "3D Dose Distribution of HDR Ir-192 Source Using PVA Cryogel".
- 40. July 1998, Liquang Tao, M.S.;** MCO Radiation Therapy Physics; "Comparison of Three Available Treatment Planning Systems at the Medical University of Ohio".
- 41. July 1998, MCO Radiation Therapy Physics;** Stephen W. Hoke, M.S., "Effect of Field Irregularities on Dose Distribution of 6 and 10 MV Photon Beams at MCO."
- 42. May 1998, MCO Occupational Health;** Jerry S. Schutt, M.S., "Operator Exposure to Electromagnetic Fields in a Tube Mill Operation".
- 43. May 1998, MCO Diagnostic Radiology Physics;** Randell Kruger, Ph.D., "Analysis and Evaluation of Selected MRI Variability Factors Using a Cervical Spine Phantom and Modified Imaging Protocol".
- 44. March 1998, MCO Radiation Therapy;** Robert A. Price, Ph.D., "Characterization of Intraoperative Radiation Therapy (IORT) Electron Beams and the Effects of Blocking on Dose Distributions Using Monte Carlo Simulations".
- 45. April 1997, MCO Occupational Health;** Ralph G. Caringi, Jr., M.S., "Measurement of Airborne Volatile Organic Vapors Collected at an Oil Refinery Wastewater Treatment Operation".
- 46. March 1996, MCO Occupational Health;** Thomas R. Carroll, M.S., "Exposure to Extremely Low Frequency Electromagnetic Fields at an Electrical Generation Facility".

APPENDIX II

A. Primary Instructor for teaching the following courses from August of 1995 – August 2009 as didactic part of the MSBS degree program in Radiation Oncology Medical Physics.

Semester	Course Title	UT-HSC Course #	Cr hrs	Comments
<i>Fall</i>	Physics of Radiation Therapy	MPHY618/818	3	Primary Faculty
	Survey of Clinical Radiation Therapy	MPHY611/811	2	Primary Faculty, shared teaching
	Radiation Dosimetry –I	MPHY612/812	4	Primary Faculty
2nd & 3 rd yr residency	Clinical Training in Radiation Therapy Physics I	MPHY661/861	8	Primary Faculty
<i>Spring</i>	Radiation Detection and Measurement	MPHY630/830	3	Primary Faculty
	Radiation Dosimetry II	MPHY613/813	4	Primary Faculty
	Radiation Biology	MPHY616/816	4	Shared teaching
2nd & 3 rd yr residency	Clinical Training in Radiation Therapy Physics II	MPHY662/862	8	Primary Faculty
<i>Summer</i>	Brachytherapy	MPHY619/819	3	Primary Faculty shared teaching
	Independent Study of Radiation Therapy (Practical Measurements)	MPHY632/832	2	Primary Faculty
2nd & 3 rd yr residency	Clinical Training in Radiation Therapy Physics III	MPHY663/863	5	Primary Faculty

From August of 2009 to present, I am the primary instructor to the following courses:

Spring					
CRN	Subject	Course #	Credits	Title	Instructor
17518	MPHY	662	8 (4+4)	Clin Trng in Radiation Onc Phys II	Pearson(4)/ Parsai (4)
33299	INDI	699	1-5	Thesis Research	Parsai
46721	MPHY	650	1	Medical Physics Seminar	Parsai
33440	MPHY	896	1-12	Dissertation Research	Parsai

Summer					
32798	MPHY	663	5	Clin Trng in Radiation Onc Phys III	Parsai
32955	MPHY	619/819	3	Brachytherapy	Parsai
33299	INDI	699	1-5	Thesis Research	Parsai
33440	MPHY	896	1-12	Dissertation Research	Parsai

Fall					
46716	MPHY	611	2	Survey Clinical Rad Onc	Parsai
46721	MPHY	650	1	Medical Physics Seminar	Parsai
33299	INDI	699	1-5	Thesis Research	Parsai
33440	MPHY	896	1-12	Dissertation Research	Parsai
46723	MPHY	618/818	3	Physics of Radiation Therapy	Parsai

B. New Courses offered in the last four years:

Semester	Course Title	UT-HSC Course #	Cr hrs	Comments
<i>Fall & Spring</i>	Introduction to Theory and Operation of Medical Linear Accelerators	MPHYS 656/856	3	Primary Faculty
<i>Spring</i>	Radiation Safety, Instrumentation & Measurement in Research and Medicine	MPHY652/852	3	Primary Faculty
<i>Fall & Spring</i>	Medical Physics Seminar	MPHY650/850	1	Primary Faculty

C. Course offered on UT Campus in Collaboration with other UT Faculty*:

Semester	Course Title	UT Course #	Cr hrs	Comments
<i>Fall & Spring</i>	Current Issues in Biological and Medical Physics	PHYS 6/8390	3	Shared Teaching with Dr. Thomas Kvale

* **Note:** This course has served as a conduit to take the news about our programs out to the community and get excellent student candidates from Ohio schools.

D. Courses Taught Outside UT-HSC Campus:

Semester	Course Title	UT Course #	Cr hrs	Comments
<i>Fall 1997</i>	Fundamentals of Atomic and Nuclear Physics	NUCMED340	3	Primary Instructor at Univ. of Findlay

F. Initiating Ph.D. Degree Program through UT Department of Physics & Astronomy:

Our Ph.D. program was discontinued during the UT-HSC's self-evaluation in 1998. Since the demand for graduates with Ph.D. degree in Medical Physics with emphasis in Radiation Oncology Physics is significant in the radiation oncology arena and no such program exists in Northwest Ohio, Dr. Thomas Kvale of UT Physics department and Dr. Ishmael Parsai, Ph.D. from Medical College of Ohio, Department of Radiation Oncology initiated a collaborative effort to offer a Ph.D. degree with emphasis in medical physics through the P&A department. We started putting the structure of this program together by mid-2000 with the idea to create an environment of didactic and clinical learning for our Ph.D. candidates. The program was then structured to contain all the needed didactic course works to meet the demands of both P&A and Radiation Oncology departments. It also was designed to train clinical medical physicists with a minimum of one year clinical clerkship as partial requirement towards receiving the degree in Physics, with emphasis in Radiation Oncology Medical Physics. The program quickly gained acceptance among faculty and students and is now a very popular Ph.D. degree in the department of P&A. We have graduated already 4 Ph.D. students who are all practicing in university settings in the field, one is planning to graduate by May of 2009, and have 4 students in that track.

In addition to aforementioned one year of clinical clerkship, the students are required to complete 21 credit hours in the P&A department, take all the medical physics courses we offer on HSC, and complete their dissertation in medical physics.

We have also collaborated with P&A faculty to initiate a BS degree concentration in medical physics to prepare students for graduate medical physics program.

A strong relationship also exists between medical physics faculty and the College of Engineering and in particular the Department of Bioengineering. In addition to lectures, research collaboration and thesis committee involvement, a joint Ph.D. degree program in biomedical engineering has been established between the College of Medicine and the College of Engineering, with one of the Ph.D. degree candidates currently entering into a medical imaging research track. Clinically interaction with medical oncology, surgery, orthopedics, neurology, as well as with basic science departments enable a range of clinical, academic, and research opportunities.

At its current form, this Ph.D. degree offers students a superb opportunity to perform both high quality scientific research and receive excellent clinical training to be able to function within a clinical environment as medical physicists.

APPENDIX III
LIST OF GRANT PROPOSAL SUBMISSIONS (UNFUNDED)

34. Date Submitted: December 26, 2017
Title: A Minimally Invasive Rectal Retractor for Radiotherapy of Pelvic Tumors
PI: Parsai, E.I; Co-I's: David Elliot, and Elahinia, Mohammad
Agency/Mechanism: Ohio Third Frontier (TVSF phase II)
Funding period: 09/01/2018 - 08/31/2019
Award Amount: \$150,000.00
Results: Not Funded
33. Date Submitted: December 15, 2016
Title: Rectal Retractor: Enhancing the Safety of Radiation Therapy in Treating Pelvic Tumors
PI: Parsai, E.I; Co-I's: Elahinia, Mohammad; and Reddy, Krishna
Agency/Mechanism: Ohio Third Frontier
Funding period: 08/01/2017 - 07/31/2018
Award Amount: \$100,000.00 matching \$50,000 from UT office of research
Results: Submitted 12/2016 (Not Funded)
32. Date Submitted: September 24, 2015
Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Radiation and Hyperthermia Treatments of Prostate Cancer
PI: Parsai, E.I; Co-I's: Shvydka, Diana; Chen, Changhu; Samay Jain; Ng, Terry; and Subramanian, Manny (from Best Medical International, Inc.)
Agency/Mechanism: DOD
Funding period: 08/01/2015 - 07/31/2017
Person/months per year: 1
Award Amount: \$375,000.00 direct payment
Results: Submitted 9/2015 (Not Funded)
31. Date Submitted: February 4, 2015
Title: Multilayer thin film detector for high energy photon imaging and spectroscopy
PI: Shvydka, D., Co-I: Parsai, E.I., Karpov, V., Compaan, A.,
Agency/Mechanism: DOE, STTR Phase I with Lucintech, Inc.
Funding period: 06/03/15 - 03/02/16
Award amount: \$150,000 (UT sub-award: \$75,000)
Person/months per year: 0.6
Results: Not funded
30. Date Submitted: December 5, 2014
Title: Development of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer
PI: Parsai, E.I; Co-I's: Shvydka, Diana, Chen, Changhu, Selman, Steven, Keck, Rick
Agency/Mechanism: Subaward, main funding: NIH - STTR Phase II with BEST Medical International, Inc.
Award amount: \$999,984 (UT sub-award: \$599,848)
Funding period: 08/01/2015 - 07/31/2017
Person/months per year: 1
Results: Not funded

29. Date submitted: August 29, 2014

PI: Shvydka, D.; Co I's: Parsai, E.I., Compaan, A., Karpov, V.

Title: Effect of Ionizing Radiation on Metal Whiskers

Agency/Mechanism: NSF, PD 09-1771

Funding period: 05/01/15 - 04/31/18

Award amount: \$267,574

Person/months per year: 0.6

Results: Not funded

28. Date submitted: Oct 29, 2014

PI: Shvydka, D.; Co I's: Parsai, E.I., Karpov, V.

Title: Multilayer thin film detector for high energy photon imaging and spectroscopy

Response to RFP by DOD

Results: not invited

27. Date Submitted: July 9, 2014

PI: Elahinia, M., Co-I's: Parsai, E.I., Reddy, K.

Title: Rectum Repositioner for Use During Radiation Therapy Applications for Prostate Cancer

Agency/Mechanism: DoD Prostate Cancer Exploration-Hypothesis Development

Funding Period: One year

Requested Funds: \$74,613.00

Results: Not funded

26. Date submitted: September 4, 2014

PI: Parsai, E.I., Co I's: Shvydka, D., Chen, Changhu, Selman, Steven, Keck, Rick, Ng, Terry.

Title: Development of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer

Agency/Mechanism: NIH, STTR

Requested fund: \$999,884.00 for a period of 2 years.

25. Date submitted: June 25, 2014

PI: Parsai, E.I.; Co I's: Elahinia, M., and Chen, C.

Title: Rectum Repositioner for Use During High Dose Rate Brachytherapy Treatment

Response to RFP by DOD

Results: not invited

24. Date submitted: 10/15/13

Title: Multilayer thin film detector for high energy photon imaging and spectroscopy

PI: D. Shvydka, Co-I: E.I. Parsai, V. Karpov

Agency/Mechanism: DOE, STTR Phase I

Funding period: 02/03/14 - 11/03/14, award amount: \$150,000 (Lucintech Inc. as the lead organization, Xunlight, Inc.)

Result: not funded

23. Date submitted: 09/18/13 (LOI)

Title: True multi-stack two dimensional atomic layer detectors

PI: D. Shvydka, Co-I: E.I. Parsai, V. Karpov, A. Compaan

Agency/Mechanism: NSF, EFRI 2-DARE

Funding period: 04/01/14 - 03/31/16, award amount: \$200,000

Result: not encouraged

22. Date submitted: December 4, 2013

PI: **Parsai, E.I.**, Co I's: Shvydka, D., Chen, Changhu, Selman, Steven, Keck, Rick, Ng, Terry.

Title: Development of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer

Agency/Mechanism: NIH, STTR

Requested fund: \$999,884.00 for a period of 2 years.

21. Date submitted: October 15, 2013

PI: Shvydka, D., Co I's: **Parsai, E.I.**, Karpov, V., Plotnikov Victor, Vijn, Aarohi, and Compaan, Alvin from Lucintech Inc.

Title: Multilayer Thin Film Detector for High Energy Photon Imaging and Spectroscopy

Agency/Mechanism: DOE, STTR

Requested fund: \$150,000 for a period of 1 year.

20. Date submitted: June 20, 2013

PI: Parsai, E.I.; Co I's: Elahinia, M., and Chen, C.

Title: Rectum Repositioner for Use during Radiation Therapy Applications

Response to RFP by DOD

19. Date submitted: August 9, 2012

PI: **Parsai, E.I.**, Co I's from UT: Shvydka, D., Feldmeier, J., Selman, S., Keck, R., Wang, Yong, and from BEST Medical from Springfield, VA, Subramanian, M.

Agency/Mechanism: DOD

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments of Prostate Cancer

Requested fund: \$590,622.00 for a period of 2 years.

18. Date of submission: February 16, 2012

PI: **Parsai, E.I.**; co-PI's: Diana Shvydka, Ph.D., Department of Radiation Oncology, UTMC, and Kristopher Wieland, Ph.D. UT Department of P&A.

Agency/Mechanism: NIH – R21

Title: Large Area X-Ray Detector Based on Thin-Film Cadmium Telluride (CdTe) for Diagnostic Imaging Applications.

Requested funding: \$275,000.00 for two years.

17. Date of submission: October 17, 2011

PI: Diana Shvydka, Ph.D., co-I's: **Parsai, E.I.**, Victor Karpov, Alvin Compaan, and Kristopher Wieland, UT Department of P&A.

Agency/Mechanism: NIH – R21

Title: Novel three-dimensional detector based on thin-film Cadmium Telluride for high energy gamma and x-ray imaging in nuclear medicine and radiation therapy applications.

Requested funding: \$412,000.00 for two years.

16. Date submitted: 06/01/2011

P.I.: **Parsai E.I.**; co-Is: Shvydka D., et al.

Agency/Mechanism: DOD PCRP, Idea Development Award

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Radiation and Hyperthermia Treatments of Prostate Cancer

Result: Not encouraged

15. Date submitted: 06/01/2011

P.I.: **Parsai E.I.**; co-Is: Shvydka D., et al.

Agency/Mechanism: DOD PCRP, Idea Development Award

Title: Rectum Repositioner for Use During High Dose Rate Brachytherapy Treatment

Result: Not encouraged

14. Date submitted: 03/31/11

PI: **Parsai E.I.**; co-I: Shvydka D.

Agency/Mechanism: UT-Promedica Translational research stimulation award

Title: New Generation Large-Area Radiation Detector Using Thin Film CdTe Material For Medical Applications Result

Result: Not awarded

13. Date submitted: 03/31/11

PI: **Parsai E.I.**; co-I: Shvydka D., et al.

Agency/Mechanism: UT-Promedica Translational research stimulation award

Title: Thermobrachytherapy Seed Implant for Concurrent Administration of Radiation and Hyperthermia

Result: Not awarded

12. Date submitted: June 9, 2010

P.I. **Parsai, E.I.**; Co I's: Shvydka, D., Keck, R., Li, Calvin, Selman, S., and Feldmeier, J.

Agency/Mechanism: DOD

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments of Prostate Cancer".

The requested fund was **\$450,000** direct cost for a two years period.

11. Date submitted: 06/01/11

PI: **Parsai E.I.**; co-Is: Shvydka D., et al.

Agency/Mechanism: DOD PCRP, Idea Development Award

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Radiation and Hyperthermia Treatments of Prostate Cancer

Result: Not encouraged

10. Date submitted: 06/01/2011

PI: **Parsai E.I.**; co-Is: Shvydka D., et al.

Agency/Mechanism: DOD PCRP, Idea Development Award

Title: Rectum Repositioner for Use During High Dose Rate Brachytherapy Treatment

Result: Not encouraged

9. Date submitted: March 16, 2010: Re-submitted

P.I. **E.I. Parsai**; Co I's: Diana Shvydka, Ph.D., (Post Doctoral Fellow), Jun Kang, M.S.

Agency/Mechanism: NIH – R21

Title: New Generation X-ray Imaging System Based on Thin-film Cadmium Telluride for Radiation Therapy Applications

The proposal was submitted for a total of **0.59 million Dollars** for a 2 years period.

8. Date submitted: March 2010

PI : **Parsai, E.I.**, Co Is: Shvydka, D., et al.

Agency/Mechanism: DOD; Idea Development Award

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments of Prostate Cancer. I

Result: Not encouraged

7. Date submitted: March 2010

PI : **Parsai, E.I.**, Co Is: Shvydka, D., et al.

Agency/Mechanism: DOD; Idea Development Award

Title: Rectum Repositioner for Use During High Dose Rate Brachytherapy Treatment.

Result: Not encouraged

6. Date submitted: December 2009:

PI: **Parsai, E.I.**, Collaborators named on this grant were: John Feldmeier, D.O., Chairman, Department of Radiation Oncology; Diana Shvydka, Ph.D., Assistant Professor, Department of Radiation Oncology; and Calvin Li, Ph.D., Assistant Professor, Department of Mechanical, Industrial, and Manufacturing Engineering (MIME).

Agency/Mechanism: NIH- STTR grant in collaboration with the BEST Medical International Inc., located in West Virginia, USA,

Title: Feasibility of a New Thermo-brachytherapy Seed for Concurrent Delivery of Brachytherapy and Hyperthermia in Prostate Cancer Treatment for a **total of \$115,900** for two years.

5. Date submitted: June 2008

PI : **Parsai, E.I.**, Co Is: Shvydka, D., (Post Doctoral Fellow), and Jun Kang, M.S.; A Ph.D.

Candidate in the department of Radiation Oncology

Agency/Mechanism: NIH- R21 exploratory grant

Title: New Generation X-ray Imaging System Based on Thin-film Cadmium Telluride for Radiation Therapy Applications for a total of **0.59 million Dollars** for a 2 years period.

4. Date of submission: April 2009

PI: **Parsai, E.I.** , Co I's: John Feldmeier, D.O. (UT-HSC), Calvin Li, Ph.D. (MIME Department, UT Main Campus), Steven Selman, M.D. (UT-HSC), Rick Keck, BS (UT-HSC), and Diana Shvydka, Ph.D.

Agency/Mechanism: Trans NIH Recovery Act Research Support Grant

Title: Development and Clinical Implementation of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer.

This proposal was submitted for **\$833,000** for three years.

3. Date of submission: June 2009

PI: **Parsai, E.I.**, Co I's: John Feldmeier, D.O., Diana Shvydka, Ph.D., and Calvin Li, Ph.D. (MIME Department, UT Main Campus).

Agency/Mechanism: NIH- R21 grant

Title: Development of a New Thermo-brachytherapy Seed for Concurrent Brachytherapy and Hyperthermia Treatments in Prostate Cancer. Collaborators:

This proposal was submitted for **\$412,000** for two years. Date of Submission

2. Date of submission: June 2009

PI: Gregory Cotter, M.D. (University of Alabama), Co-PI: **E. Ishmael Parsai, Ph.D.**, (University of Toledo), and Ralph Doublebower, M.D., Ph.D. (University of Toledo).

Agency/Mechanism: NCI

Title: National Radiation Oncology Practice Accreditation Project to Develop Radiation Oncology Standards, Promote Radiation Oncology Practice Accreditation and study Characteristics and Patient Care Outcomes of Accredited Radiation Oncology Practices

The proposal requested **\$100,000** Funding for 1 year.

1. Date of submission: May 2000

PI: Sung-Joon Ye, Ph.D., Co-PI: **E. Ishmael Parsai, Ph.D.**

Agency/Mechanism: Whitaker Foundation

Title: "Effect of Neutron Beam Directionality on Cancer Cell Survival and Tumor Control Probability for Boron-Neutron Capture Therapy.

This proposal was submitted for **\$232,325** to be awarded in three years.

APPENDIX IV

Detail List of Continuing Education Classes and Workshops

- August 2018 Attended the 2018 AAPM annual meeting held in Nashville, TN, where I received 22.75 **SAM's** & 29.5 **CAMPEP** continuing education credits (MPCEC) equivalent to category 1 AMA. I also received 5 **Cr hrs** of MPCEC poster viewing during this annual meeting.
- April 2018 Attended the AAPM-ORVC spring educational symposium and received 4.5 MPCEC credit hours.
- Sept 2017 Attended the 2017 ASTRO annual meeting held in San Diego, CA, where I received 25.4 **CAMPEP** continuing education credits equivalent to category 1 AMA credits.
- August 2017 Attended the 2017 AAPM annual meeting held in Denver, Colorado, where I received 8 **SAM's** & 36.5 **CAMPEP** continuing education credits equivalent to category 1 AMA. I also received 8 **Cr hrs** of poster viewing during this annual meeting.
- October 2016 Attended a week long physics modeling workshop/course offered by the RaySearch in New York city in advance of purchasing the RayStation treatment planning system. This course was approved for 22 **CAMPEP** credit hours.
- Sept 2016 Attended the 2016 ASTRO annual meeting held in Boston, MA, where I received 34.5 **CAMPEP** continuing education credits.
- August 2016 Attended the 2016 AAPM annual meeting held in Washington, DC, where I received 19 **SAM's** & 42 **CAMPEP** continuing education credits equivalent to category 1 AMA. I also received 8 **Cr hrs** of poster viewing during this annual meeting.
- Nov 2015 Attended a week long Varian workshop on Eclipse 13.6 Treatment Planning with IMRT and VMAT. This was held in education headquarter of Varian in Los Vegas, Nv.
- Oct 2015 Attended the 2015 ASTRO annual meeting held in San Antonio, Tx, where I received 31 **MPCEC** continuing education credits equivalent to category 1 AMA. I also received 8 **Cr hrs** of poster viewing during this annual meeting.
- July 2015 Attended the 2015 AAPM annual meeting held in Anaheim, CA, where I received 19 **SAM's** & 42 **MPCEC** continuing education credits equivalent to category 1 AMA. I also received 8 **Cr hrs** of poster viewing during this annual meeting.
- Nov 2014 Attended a 5 days (Nov 10-14) manufacturer operated workshop in clinical operation and advanced techniques for SRS, SBRT using Varian Edge Accelerator in Lisbon Portugal.

- Sept 2014 Attended the 2014 ASTRO annual meeting held in San Francisco, CA, where I received 29 **MPCEC** continuing education credits equivalent to category 1 AMA. I also received **8 Cr hrs** of poster viewing during this annual meeting.
- July 2014 Attended the 2014 AAPM annual meeting held in Austin, Tx, where I received **21 SAM's & 42.34 MPCEC** continuing education credits equivalent to category 1 AMA. I also received **8 Cr hrs** of poster viewing during this annual meeting.
- August 2013 Attended the 2013 AAPM annual meeting where I acquired SAM's & continuing education credits. (Indianapolis, IN). I received **32 hrs** of category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC), and **8 Cr hrs** of poster viewing. I also received **10 hrs of SAM** credits. List of courses and certificate provided by AAPM.
- July 2012 Attended the 2012 AAPM annual meeting where I acquired SAM's & continuing education credits. (Charlotte, NC). I received **33 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC), and **8 Cr hrs** of poster viewing. I also received **12 hrs of SAM** credits. List of courses and certificate provided by AAPM.
- May 2012 Attended the World Congress in Medical Physics held in Beijing China. I presented 3 papers there and attended a number of refresher courses and advanced technical presentations.
- July 2011 Attended various SAM and refresher course sessions at the 2011 AAPM annual meeting held in Vancouver, CA. I received **32 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC), and **8 Cr hrs** of poster viewing. I also received **8 hrs of SAM** credits. List of courses and certificate provided by AAPM.
- March 2011 Attended a week long course/workshop of Varian OBI-PHYSICS at Los Vegas during March 28 – April 1, 2011. The courses consisted of didactic and hands on training for OBI imaging, Cone beam CT and KV imaging using Varian IX and Trilogy accelerators.
- Feb 2011 Attended the 2011 ACRO annual meeting held in San Diego, CA, during February 24-26, and received **1 SAM** and **19.25 hrs** of category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). Certificate of CME documentation was provided by ACRO.
- July 2010 Attended various SAM's & refresher continuing education sessions at the 2010 AAPM annual meeting, (Philadelphia, PA) and received **37 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by AAPM.
- Feb 2010 Attended CME seminars and refreshers at the 2010 ACRO annual meeting, (Disney, Florida) and received **15 hrs** of category 1 AMA continuing education credit equivalent to Medical Physics Continuing Education Credits (MPCEC).

List of courses and certificate provided by ACRO.

- July 2009 Attended various SAM's & refresher continuing education sessions at the 2009 AAPM annual meeting, (Anaheim, CA) and received **37 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by AAPM.
- March 2009 Attended a 3.5 days course/workshop conducted by Philips Medical on Advanced ADAC Pinnacle Treatment Planning and IMRT, March 10-13th, 2009.
- Feb 2009 Attended CME seminars and refreshers at the 2009 ACRO annual meeting, (Los Vegas, NV) and received **15 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by ACRO.
- Sept 2008 Attended ASTRO annual meeting and accumulated 30 credit hours of MPCEC continuing education hours.
- July 2008 Attended various SAM's & refresher continuing education sessions at the 2008 AAPM annual meeting, (Houston, Texas) and received **34 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by AAPM.
- May 2008 Attended various SAM'S (Self Assessment Modules) & refresher courses at the 2008 ACMP annual meeting, (Seattle, Washington) and received **18 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by ACMP.
- February 08 Attended various refresher courses at the 2008 ACRO annual meeting, (Miami, Florida) and received **14 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by ACRO.
- October 2007 During the 2007 ASTRO annual meeting held in Los Angeles, CA, October 27-November 1, attended continuing education/refresher courses and scientific sessions and received **33.5 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- July 2007 During the 2007 AAMP annual meeting held in (Minneapolis, MN, July 21-27) attended continuing education/refresher courses and scientific sessions and received **39 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- August 2006 Attended related refresher courses and scientific sessions at the 2006 AAMP annual meeting, (Orlando, FL) and received **42.5 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.

- June 06 Attended various refresher courses at the 2006 ACMP annual meeting, (Los Vegas, NV) and received **18 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- February 06 Attended various refresher courses at the 2006 ACRO annual meeting, (Orlando, Florida) and received **15.5 hrs** category 1 AMA credit equivalent to Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate provided by ACRO.
- October 04 Attended various refresher courses at the 2004 ASTRO annual meeting, (Atlanta, GA) and received **22 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- July 2004 Attended various refresher courses at the 2004 AAMP annual meeting, (Pittsburgh, PA) and received **32 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- June 2004 Attended various refresher courses at the 2004 ACMP annual meeting, (Scottsdale, AZ) and received **19 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- June 2004 A two days in-house course in “Ultrasound Image Guidance Techniques for Placement of Radiation Treatment” earning **1.5 category A CE** Credits held by Nomos Corporation in Rad Onc Department. (June9-10, 2004).
- Feb 2004 Attended various refresher courses at the 2004 ACRO annual meeting, (Orlando, FL) and received **8 Credit hours** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- Jan 2004 Attended a training course conducted by the manufacturer of the Varisource, the Varian Company for the HDR 200 series Varisource (in both Brachyvision and HDR hardware) from Jan 27-31st 2004 at the Medical University of Ohio.
- Nov 2003 Attended a two and a half weeks long course in second line Physics training for the Elekta linear accelerators in Crawly England. As a successful attendee of this course, I received a certificate of achievement in second line physics for Elekta accelerators.
- October 2003 Attended various refresher courses at the 2003 ASTRO annual meeting, (Salt Lake City, Utah) and received **5.5 Credit hours** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- August 2003 Attended various refresher courses at the 2003 AAPM meeting, (San Diego, CA) and received **24 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.

- July 2002 Attended a one week course in **Advanced** ADAC treatment planning system held in Milpitas California in ADAC's education center, July 20-25, 2002.
- July 2002 Attended various refresher courses at the 2002 AAPM meeting, (Montreal, Canada) and received **18 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- May 2002 Attended the American Brachytherapy Society meeting in Orlando Florida May 21-24, 2002. Attended various refresher courses and received **19 CME credits**.
- May 2002 Attended a one week course in ADAC treatment planning system held in Milpitas California in ADAC's education center, May 11-16, 2002.
- March 2002 Attended a one week course in Precise Treatment Planning first line service training course held in Montreal, Canada by Elekta Oncology System.
- January 2002 Attended a continuing education workshop for IMRT applications held in William Boumont Hospital, in Royal Oak, Michigan during January 18-19, 2002.
- October 2001 Attended a one week long Monte Carlo Workshop on Omega Beam, Ottawa, Canada, October 1-4.
- July 2001 Attended various refresher courses at the 2001 AAPM meeting, (Salt Lake City, Utah) and received **34 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available from CAMPEP.
- March 2001 Attended a one day didactic training seminar/workshop by Novoste Corporation for performing IVBT at MCO
- Nov 2000 Attended two full days hands-on workshop and didactic classes held by MMS co. and Proseed co. The workshops were on applications & operation of MMS system for low dose rate brachytherapy dosimetry, and the Proseed's techniques in prostate seed implantation. Two cases were proctored on that day.
- Oct 2000 During the annual ASTRO-2000 meeting, attended equivalent to **26.75 hrs** of CME credits. List of courses and certificate will be sent by the ASTRO office.
- July 2000 Attended various refresher courses at the 2000 AAPM meeting (WC-2000) and received **33.75 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available on certificate page from CAMPEP.
- March 2000 Fifth Radiation Oncology Clinical Physics Seminar, a 2 days CAMPEP accredited workshop held in Gainesville, Florida. Credits received = **9.5 MPCECs**.
- Sept. 99 Attended the CAMPEP accredited medical physics education program entitled "The third Annual International Conference on New and Future Developments in High Dose Rate Brachytherapy" held in Detroit, Michigan.

- July 1999 Attended various refresher courses at the 1999 AAPM meeting and received **27 hrs** of Medical Physics Continuing Education Credits (MPCEC). List of courses and certificate available.
- April 1999 A One Week Long Workshop and Training in Physical and Clinical Applications of HDR Using Varisource (From Varian) in Long Beach, California (April 4-9, 1999).
- Nov. 1998 A One Week Workshop of HDR Training on Varisource (From Varian) in Palo Alto, California (November 2-6, 1998).
- Aug 1998 Attended the following refresher courses at the 1998 AAPM meeting and received **22 hrs** of Medical Physics Continuing Education Credits (MPCEC) credits.
- May 1998 A Two Days Workshop on Ultrasound-Guided Transperineal Brachytherapy for Early Stage Prostate Cancer; Swedish Medical Center, Seattle, Washington **11hrs. of Category 1 CME.** (May 4-5, 1998)
- Feb 1998 Received **4 hrs in category 1** of the physician's recognition award of the AMA.
- Dec. 1997 International Brachytherapy Workshop and Conference on "High Dose Rate Brachytherapy for Prostate Cancer Under Ultrasound Guidance". Texas Cancer Center, Sherman, Texas. (December 5,6).
- July 1997 Attended the following refresher courses at the 1997 AAPM meeting in Milwaukee, Wisconsin: 1. Radiosurgery Physics; 2. Technical and Clinical Aspects of Portal Imaging; 3. Calculation Algorithms for High Energy Beams (Convolution/Superpositions and Monte Carlo); 4. Clinical Brachytherapy Techniques; and 5. Inhomogeneity Calculations.
- June 1997 AAPM Great Lakes Chapter Meeting on "External Beam Treatment Planning - State of the Commercially Available Art", Harper Hospital, Detroit, MI. (A one day workshop)
- June 1997 International Brachytherapy Workshop on "New and Future Development in High Dose Rate Brachytherapy". Wayne State University and Grace Hospital, Karmanos Cancer Institute, Detroit MI. (June 26-28).
- July 1996 Attended various refresher courses and presentations at the annual meeting of AAPM in Philadelphia, PA.
- July 1995 Attended the following refresher courses at the 1995 AAPM meeting in Boston: 1. Dosimetry and Treatment Planning of Radioimmunotherapy, 2. Commissioning and QA of TP Systems: Photon, Electron, and Brachytherapy Components.

- July 1994 Attended various refresher courses and presentations at the annual meeting of AAPM in Anaheim California.
- July 1993 Attended various refresher courses and presentations at the annual meeting of AAPM in Washington D.C.
- 7/20-31/92 Successfully completed a course on External Beam Dosimetry, Principles and Calibrations. University of Texas, M.D. Anderson Cancer Center, Department of Radiation Physics.
- 7/20/1991 A one day workshop on Mammography QC for Medical Physicist A symposium held by the American College of Radiology, University of CA. at Santa Cruze.
- 7/15-19/91 AAPM summer school, "Specifications, Acceptance Testing, and Quality Control of Diagnostic X-ray Imaging Equipment."
- RSNA 90 Received **12 credit hours** of continuing education in different disciplines of radiological Physics.
- 10/21-26/90 One week class on Varian Linac C-series maintenance, sponsored by the Varian Medical Service, Inc. Milpitas, CA.
- 9/26-28/90 Mammography workshop, a three days long seminar sponsored by the Oklahoma State Department of Health.
- 7/17/1989 AAPM summer school, "Expanding the role of Medical Physics in Nuclear Medicine."
- 6/21/1989 Applications of Physics in Radiation Therapy, a one week long practical training workshop under Dr. Suntharalingam at Thomas Jefferson University Hospital in Philadelphia, PA.