

Employment

The University of North Carolina at Chapel Hill

12/1/2017 – present

Chapel Hill, NC

- Primary machine physicist
Responsible for the quality control program for two Elekta (VersaHD) and one Siemens (Oncor) linear accelerators
- Secondary CT simulator physicist
Support of the primary CT physicist for the quality control program of two Phillips Big Bore systems
- Member of the stereotactic physics team
Responsible for planning, reviewing and attending CyberKnife and linac-based radiosurgery and radiotherapy treatments
- Other duties: Prostate brachytherapy implant planning and loading, high-dose rate brachytherapy planning, equipment and software commissioning, patient specific quality assurance, teaching

Auckland Radiation Oncology (ARO)

08/10/2015 – 08/25/2017

Epsom, Auckland, New Zealand

- Primary machine physicist
Responsible for the quality control program for three Elekta linear accelerators (2 Agility, 1 MLCi)
- Other duties: General clinical support, equipment commissioning, patient-specific quality assurance, teaching

Education

Medical Physics Resident

07/01/2013 – 06/30/2015

North Carolina Cancer Hospital

University of North Carolina at Chapel Hill, NC

Doctorate of Philosophy - Medical Physics

08/19/2008 - 05/15/2013

Duke University, Durham, North Carolina

- Thesis title: "Filtering strategies and consensus segmentation methods for positron emission tomography (PET) images and their applications to radiation therapy."
- Supervisory Committee Members: Drs Shiva Das, PhD (Chair), James Bowsher, PhD, Timothy Turkington, PhD, David Yoo, MD and Oana Cracinescu, PhD
- *Investigated*
 - (1) *how traditional Gaussian filters and edge preserving bilateral filters impact the accuracy of several different PET segmentation methods*
 - (2) *how the use of non-linear mixed models provides a superior approach to analyzing a commonly used segmentation performance metric*
 - (3) *how consensus volumes created from combining multiple independent segmentation methods compares in accuracy relative to experienced radiation oncologists*
 - (4) *how consensus volumes influence the definition of gross target volumes for head and neck cancer patients for experienced versus inexperienced physicians*

Master of Science with Distinction – Medical Physics

12/15/2006 - 07/31/2007

University of Canterbury, New Zealand

- Thesis title: "Variation of image counts with patient anatomy and development of a Monte Carlo simulation system for whole-body bone scans."
- Supervisory Committee Members: Drs Darin O'Keeffe, PhD, (Chair), Richard Watts, PhD, and Deloar Hossain, PhD.
- *Investigated relationship between patient specific parameters and observed count rates for optimization of radioactivity administered clinically*

Bachelor of Science with 1st Class Honours – Medical Physics

01/28/2006 - 11/30/2006

University of Canterbury, New Zealand

- *Validated difficult dosimetry measurements via creation of a computer model of an industrial radioactive source*

Bachelor of Science – Physics and Mathematics

01/28/2003 - 11/30/2005

University of Canterbury, New Zealand

Certifications

American Board of Radiology (ABR) – Therapeutic Medical Physics

June 2017

Professional Affiliations

The American Association of Physicists in Medicine (AAPM)

2009 - Present

Clinical Experience

External Beam Radiotherapy

- Operation of Elekta, Siemens, and TomoTherapy linear accelerators
- Beam scanning, steering and calibration using 3D/2D/1D beam scanning systems (Sun Nuclear 3D Cylindrical Tank with SNC Dosimetry software, IBA Blue Phantom and Blue Phantom² with OmniPro and myQA software, Standard Imaging TomoTherapy HD 2D tank and 1D tank)
- Acceptance testing and commissioning of two Elekta Versa HD linear accelerators, and upgrade and matching of a MLCi head to the Agility system
- External beam treatment planning (RayStation, TomoTherapy, Pinnacle, and Plan UNC)
- Monthly machine QA (per AAPM TG-40 and TG-142)
- Annual machine calibration and QA (per AAPM TG-51, TRS-398 and TG-142)
- Electron radiotherapy: skin bolus, skin collimation, film dosimetry and MU hand calculations
- Chart checks (weekly and pre-treatment) and secondary dose calculations with RadCalc software
- Patient-specific quality assurance for IMRT/VMAT treatments
- Radiobiology calculations for dose summation, treatment breaks, fractionation schedule conversions

Brachytherapy

- Operation of the Nucletron microSelectron v3 afterloader, Oncentra Brachy treatment planning system
- Acceptance testing and calibration of brachytherapy sources
- Commissioning the Nucletron Rotterdam nasopharynx applicator
- HDR and LDR gynecological treatments (Ir-192 and Cs-137)
- Nucletron tandem and ovoid, and vaginal cylinder treatments
- LDR prostate implants (I-125)
- COMS eye-plaques (I-125)

Stereotactic Radiotherapy/Radiosurgery

- Annual and monthly calibrations of the Accuray CyberKnife per AAPM TGs 51, 135, and 142
- SRS/SBRT treatment planning with Multiplan CyberKnife and RayStation treatment planning software
- Supervision of SRS/SBRT treatments for cranial, spine, lung, pelvis, and extremities

Imaging and Image-Guided Radiotherapy

- Monthly QA for Phillips Brilliance Big Bore CT and Elekta XVI and iView systems
- Annual CTDI verification for Phillips Brilliance Big Bore CT and Elekta XVI CBCT
- IGRT with EPIDs, cone beam CT (Siemens MVCT, Elekta XVI 5.0), Vision RT system, Calypso[®], CT on rails
- Gated radiotherapy with Vision RT optical tracking system, Phillips 4DCT

Special Procedures

- Operation of Mobetron Intra-Operative Electron Radiotherapy (IORT) system
- Equipment setup, output calibration, and MU hand calculations for IORT
- Output verification and MU hand calculations for Total Body Irradiation
- In-vivo dosimetry using MOSFETS, TLDs and OSLDs

Shielding

- Shielding calculations/reporting for linear accelerator, HDR, and PET/CT vaults (per NCRP 147 and NCRP 151)

Clinically Applicable Research

- Segmentation of PET and SPECT-avid features for identifying disease processes and functional tissue, including a specific study of lung perfusion changes in patients undergoing CyberKnife SBRT using CT and SPECT data
- Development and implementation of protocols and software to perform single and multiple color channel corrections for absolute dosimetry with radiochromic film and Epson XL10000 flatbed scanner
- Development and implementation of analytical software that utilizes DICOM RT Plan files to compute a complexity score as an independent check of IMRT plan quality
- Analysis of port film rejection rates as a function of physician cross-coverage using the MOSAIQ® record and verify oncology information system

Publications

- Das, S, **McGurk, R**, Bayouth, J, Boellaard, R, Bowen, S, Bowsher, J, Erdi, YE, Jeraj, R, Kinahan, P, Mawlawi, O, Mifton, M, Mutic, S, Xing, L, Yin, FF, AAPM Task Group No. 174, Utilization of 18F-Fluorodeoxyglucose Positron Emission Tomography (FDG-PET) in Radiation Therapy, (*under review, to be published in Medical Physics*)
- McGurk R**, Smith VA, Bowsher J, Lee JA, Das SK, Influence of filter choice on 18F-FDG PET segmentation accuracy determined using generalized estimating equations, *Physics in Medicine and Biology*, 58, 3517–34 (2013).
- McGurk R**, Bowsher J, Lee JA, Das SK, Combining multiple FDG-PET radiotherapy target segmentation methods to reduce the effect of variable performance of individual segmentation methods. *Medical Physics*, 40(4), 042501 (2013).
- McGurk R**, Hadley C, Jackson IL, Vujaskovic Z, Development and Dosimetry of a Small Animal Lung Irradiation Platform. *Health Physics*, 2012;103:454-462 (2012).
- Jackson IL, Xu P, Hadley C, Katz BP, **McGurk R**, Down JD, Vujaskovic Z, A Preclinical Rodent Model of Radiation-induced Lung Injury for Medical Countermeasure Screening in Accordance With the FDA Animal Rule. *Health Physics*, 103:463-473 (2012).
- McGurk R**, Seco J, Riboldi M, Wolfgang J, Segars P, Paganetti H, Extension of the NCAT phantom for the investigation of intra-fraction respiratory motion in IMRT using 4D Monte Carlo. *Phys. Med. Biol.*, 55(5):1475 (2010).
- McGurk R**, Deloar HM, Packer KA, Turner J, A Monte Carlo model of an industrial gauge for radiation protection purposes. *Australas. Phys. Eng. Sci. Med.*, 31(1):42 (2008)

Presentations

- McGurk, R**, Tracton, G, Portal Image Rejection Rates in Cross Coverage Situations, *The American Association of Physicists in Medicine (AAPM) Annual Meeting*, Nashville, TN, July 2018
- McGurk, R**, Schreiber, E, Das, S, Zagar, T, Green R, Lawrence, MV, Sheikh, A, McCartney W, Rivera P, Marks, L, Assessing Radiation-Induced Reductions in Regional Lung Perfusion Following Stereotactic Radiotherapy for Lung Cancer, *The American Association of Physicists in Medicine (AAPM) Annual Meeting*, Anaheim, CA, July 2015
- McGurk, R**, Smith, VA, Price, MJ, Evaluating IMRT Plan Deliverability via PTV Shape and MLC Motion, *The American Association of Physicists in Medicine (AAPM) Annual Meeting*, Austin, TX, July 2014
- McGurk R**, Smith VA, Bowsher J, Lee JA, Das SK, Modeling of the Dice Coefficient for PET Segmentation Studies, *The American Association of Physicists in Medicine (AAPM) Annual Meeting*, Indianapolis, IN, August 2013
- McGurk R**, Yoo D, Lee J, Lee JA, Das SK, Guidance volumes for PET segmentation: effect of physician experience, *American Society of Radiation Oncology 54th Annual Meeting*, Boston, Massachusetts, October 2012

McGurk R, Smith VA, Bowsher J, Lee JA, Das SK, Optimal image filtration strategies for PET segmentation, *The American Association of Physicists in Medicine (AAPM) Annual Meeting*, Charlotte, NC, June 2012

McGurk R, Bowsher J, Lee JA, Das SK, Performance of a Novel Region Growing Segmentation Method for Nuclear Medicine, *American Society of Radiation Oncology 53rd Annual Meeting*, Miami Beach, Florida, October 2011

McGurk R, Smith TJ, Das SK, Performance of a Novel Region Growing Segmentation Method for Nuclear Medicine, 2011 *Joint AAPM/Canadian Organization of Medical Physicists (COMP) Annual Meeting*, Vancouver, Canada, July 2011

Sporting Achievements

Garmin Half Marathon Series	Auckland, New Zealand	November 2016 – March 2017
Asheville and Outer Banks Marathons	Asheville, NC and Manteo, NC	March 2013, November 2012
Half Ironman Triathlon	White Lake, NC	March 2012
New Zealand Age-Group Champion	New Zealand Swimming Championships	March 2001