Ross James McGurk, PhD

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 Phantom^2 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

- Analysis of user-reported errors in radiation oncology using an in-house incident learning system to improve patient safety and process/quality improvements
- 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 SK, **McGurk R**, Miften M, Mutic S, Bowsher J, Bayouth J, Erdi Y, Mawlawi O, Boellaard R, Bowen SR, Xing L, Bradley J, Schoder H, Yin FF, Sullivan DC, Kinahan P, Task Group 174 Report: Utilization of [^{18}F]Fluorodeoxyglucose Positron Emission Tomography ([^{18}F]FDG-PET) in Radiation Therapy, *Medical Physics,* 2019 (Published, Early View)

Mullins, BT, **McGurk R,** McLeod RW, Lindsay D, Amos A, Gu D, Chera B, Marks L, Das SK, Mazur L, Human Error Bowtie Analysis to Enhance Patient Safety in Radiation Oncology, *Practical Radiation Oncology*, 2019 (In Press, Corrected Proof)

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, Mullins B, Amos A, Gu D, Chera B, Marks L, Das S, Mazur L, Analysis of SBRT Planning and Delivery Incidences Via Customized Process Mapping, *The American Association of Physicists in Medicine Physicists in Medicine (AAPM) Annual Meeting*, San Antonio, TX, July 2019

Pappafotis R, Rankine L, Fenoli J, **McGurk R**, Off-Axis Winston-Lutz Analysis Performed On Elekta Versa HD Linear Accelerators, *The American Association of Physicists in Medicine Physicists in Medicine (AAPM) Annual Meeting*, San Antonio, TX, July 2019

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

Academic Awards

Edward and Isabel Kidson Scholarship	NZ $6,000 per annum	January 2013
TEC Bright Future Award	US $25,000 per annum + costs	January 2010-December 2012
Fulbright Scholar, NZ MoRST Award	US $25,000	October 2007-July 2008
Ernest Rutherford Memorial Scholarship	NZ $20,000 per annum	December 2006-December 2008

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