

Marcel Van Herk, PhD, MSc, BSc
Academic (Teaching & Research) Professor
Division of Cancer Sciences (L5)

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Overview

Professor of Radiotherapy Physics. This is a joint post between the University of Manchester and the Christie. Marcel is responsible for developing a programme of international leading radiotherapy physics research and innovation to deliver direct patient benefits. The main focus is on accuracy of radiotherapy including target volume definition, treatment planning, image guidance and treatment follow-up.

Work Stream 4 for NCRI Clinical and Translational Radiotherapy Research (CTRad) Working Group

Employment

Chair in Radiotherapy Physics

Academic (Teaching & Research) Professor

Division of Cancer Sciences (L5)

The University of Manchester

1 Aug 2016 → present

Research outputs

Probabilistic evaluation of plan quality for time-dependent anatomical deformations in head and neck cancer patients

Robbins, J., van Herk, M., Eiben, B., Green, A. & Vásquez Osorio, E., May 2023, In: *Physica Medica*. 109, 102579.

Accurate segmentation of head and neck radiotherapy CT scans with 3D CNNs: consistency is key

Henderson, E., Vasquez osorio, E., Van herk, M., Brouwer, C. L., Steenbakkens, R. J. H. M. & Green, A. F., 9 Mar 2023, (E-pub ahead of print) In: *Physics in Medicine & Biology*.

First-in-Human Technique Translation of Oxygen-Enhanced MRI to an MR Linac System in Patients with Head and Neck Cancer

Dubec, M. J., Buckley, D. L., Berks, M., Clough, A., Gaffney, J., Datta, A., McHugh, D. J., Porta, N., Little, R. A., Cheung, S., Hague, C., Eccles, C. L., Hoskin, P. J., Bristow, R. G., Matthews, J. C., van Herk, M., Choudhury, A., Jm Parker, G., McPartlin, A. & Pb O'Connor, J., 2 Mar 2023, In: *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*. p. 109592

Cardiac Function Modifies the Impact of Heart Base Dose on Survival: A Voxel-Wise Analysis of Patients With Lung Cancer From the PET-Plan Trial

Craddock, M., Nestle, U., Koenig, J., Schimek-Jasch, T., Kremp, S., Lenz, S., Banfill, K., Davey, A., Price, G., Salem, A., Faivre-Finn, C., van Herk, M. & McWilliam, A., 1 Jan 2023, In: *Journal of thoracic oncology : official publication of the International Association for the Study of Lung Cancer*. 18, 1, p. 57-66 10 p.

Suitability of propagated contours for adaptive replanning for head and neck radiotherapy

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Automatic Identification of Segmentation Errors for Radiotherapy Using Geometric Learning

Henderson, E. G. A., Green, A. F., Herk, M. V. & Vasquez Osorio, E. M., 16 Sep 2022, *Medical Image Computing and Computer Assisted Intervention – MICCAI 2022: 25th International Conference, Singapore, September 18–22, 2022, Proceedings, Part V*. Wang, L., Dou, Q., Fletcher, P. T., Speidel, S. & Li, S. (eds.). Springer Nature Switzerland AG, Vol. 13435. p. 319-329 11 p. (Lecture Notes in Computer Science; vol. 13435).

The geometric and dosimetric effect of algorithm choice on propagated contours from CT to cone beam CTs

Nash, D., Juneja, S., Palmer, A. L., van Herk, M., McWilliam, A. & Osorio, E. V., Aug 2022, In: *Physica Medica*. 100, p. 112-119 8 p.

Causal relation between heart irradiation and survival of lung cancer patients after radiotherapy

Brink, C., Bernchou, U., Bertelsen, A., Hansen, O., Schytte, T., Hjelmborg, J. V. B., Holloway, L., van Herk, M., Johnson-Hart, C., Price, G. J., Aznar, M. C., McWilliam, A., Faivre-Finn, C. & Hansen, C. R., Jul 2022, In: *Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology*. 172, p. 126-133 8 p.

Clinical and radiomics prediction of complete response in rectal cancer pre-chemoradiotherapy

Mbanu, P., Saunders, M. P., Mistry, H., Mercer, J., Malcomson, L., Yousif, S., Price, G., Kochhar, R., Renehan, A. G., van Herk, M. & Osorio, E. V., Jul 2022, In: *Physics and Imaging in Radiation Oncology*. 23, p. 48-53 6 p.

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Abravan, A., Price, G., Banfill, K., Merchant, T., Craddock, M., Wood, J., Aznar, M. C., McWilliam, A., Van Herk, M. & Faivre-Finn, C., 13 Jun 2022, (Accepted/In press) In: *Frontiers in Oncology*.

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PD-0317 A novel method to predict OAR contour errors without a ground truth using geometric learning

Henderson, E., Green, A., Van Herk, M. & Vasquez Osorio, E., 1 May 2022, p. S279-S280. 2 p.

Optimising a 3D convolutional neural network for head and neck computed tomography segmentation with limited training data

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Argota-Perez, R., Robbins, J., Green, A., Herk, M. V., Korreman, S. & Vásquez-Osorio, E., Apr 2022, In: *Physics and Imaging in Radiation Oncology*. 22, p. 13-19 7 p.

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Effect of systemic inflammation biomarkers on overall survival after lung cancer radiotherapy: a single-center large-cohort study

Abravan, A., Salem, A., Price, G., Faivre-Finn, C. & van Herk, M., 1 Feb 2022, In: *Acta oncologica (Stockholm, Sweden)*. 61, 2, p. 163-171 9 p.

Heart dose and cardiac comorbidities influence death with a cardiac cause following hypofractionated radiotherapy for lung cancer

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In Reply to Ebert et al.

Shortall, J., Palma, G., Mistry, H., Vasquez Osorio, E., McWilliam, A., Choudhury, A., Aznar, M. C., Van Herk, M. & Green, A., 2022, In: *International Journal of Radiation: Oncology - Biology - Physics*. 112, 3

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PO-1695 Accurate H&N 3D segmentation with limited training data using 2-stage CNNs

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Towards personalised treatment for prostate cancer biology improves image-based data mining models

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MRI and CBCT for lymph node identification and registration in patients with NSCLC undergoing radical radiotherapy

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van Herk, M., Price, G., Clough, A., Sanders, J., Faivre-Finn, C., Eccles, C. & Aznar, M., Jun 2021, In: *Medical Physics*. 48, 6

Optimising use of 4D-CT phase information for radiomics analysis in lung cancer patients treated with stereotactic body radiotherapy

Davey, A., Van Herk, M., Faivre-Finn, C., Brown, S. & McWilliam, A., 21 Apr 2021, (Accepted/In press) In: Physics in Medicine and Biology.

Novel Methodology to assess the Effect of Contouring Variation on Treatment Outcome

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Three-dimensional (3D) magnetic resonance volume assessment and loco-regional failure in anal cancer: early evaluation case-control study

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Protecting the Heart: A Practical Approach to Account for the Full Extent of Heart Motion in Radiation Therapy Planning

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Predictive value of vascular calcification identified in 4D planning CT of lung cancer patients treated with stereotactic body radiation therapy

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Protecting the heart: a practical approach to account for the full extent of heart motion in radiotherapy planning

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Novel methodology to investigate the impact of radiation dose to heart sub-structures on overall survival

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Radiotherapy-related lymphopenia affects overall survival in patients with lung cancer

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Characterizing local dose perturbations due to gas cavities in Magnetic Resonance guided Radiotherapy

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Identification of patterns of tumour change measured on CBCT images in NSCLC patients during radiotherapy

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In Regard to Zhang et al

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OC-0522 Characterising dose changes due to unplanned gas cavities in Magnetic Resonance guided Radiotherapy

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OC-0632 Radiotherapy-related lymphopenia affects overall survival in patients with lung cancer

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OC-0404 Dose to vascular calcifications is predictive for overall survival in lung cancer patients

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Avoiding cardiac toxicity in patients undergoing curative intent radiotherapy for lung cancer

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Van Herk, M., Gilhuijs, K. G., el-Gayed, A. A., van Herk, M. & Vijlbrief, R. E., Nov 1993, In: Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology. 29, 2

Verification of lung attenuator positioning before total body irradiation using an electronic portal imaging device.

Van Herk, M., Gladstone, D. J., van Herk, M. & Chin, L. M., 30 Sep 1993, In: International journal of radiation oncology, biology, physics. 27, 2

Automatic on-line inspection of patient setup in radiation therapy using digital portal images.

Van Herk, M., Gilhuijs, K. G. & van Herk, M., 1993, In: Medical Physics. 20, 3, p. 667-77

A fast algorithm for local minimum and maximum filters on rectangular and octagonal kernels

van Herk, M., Jul 1992, In: Pattern Recognition Letters. 13, 7, p. 517-521 5 p.

A review of electronic portal imaging devices (EPIDs).

Boyer, A. L., Antonuk, L., Fenster, A., Van Herk, M., Meertens, H., Munro, P., Reinstein, L. E. & Wong, J., 1992, In: Medical Physics. 19, 1

Automatic verification of radiation field shape using digital portal images.

Van Herk, M., Bijhold, J., Gilhuijs, K. G. & van Herk, M., 1992, In: Medical Physics. 19, 4, p. 1007-14

Sampling methods for a matrix ionization chamber system.

Van Herk, M., van Herk, M., Bijhold, J., Hoogervorst, B. & Meertens, H., 1992, In: Medical Physics. 19, 2, p. 409-18

Fast evaluation of patient set-up during radiotherapy by aligning features in portal and simulator images.

Van Herk, M., Bijhold, J., van Herk, M., Vijlbrief, R. & Lebesque, J. V., Dec 1991, In: Physics in Medicine and Biology. 36, 12

Radiation field edge detection in portal images.

Van Herk, M., Bijhold, J., Gilhuijs, K. G., van Herk, M. & Meertens, H., Dec 1991, In: Physics in Medicine and Biology. 36, 12

Physical aspects of a liquid-filled ionization chamber with pulsed polarizing voltage.

Van Herk, M. & van Herk, M., 1991, In: Medical Physics. 18, 4

First clinical experience with a newly developed electronic portal imaging device.

Van Herk, M., Meertens, H., van Herk, M., Bijhold, J. & Bartelink, H., May 1990, In: International journal of radiation oncology, biology, physics. 18, 5

An inverse filter for digital restoration of portal images.

Van Herk, M., Meertens, H., van Herk, M. & Weeda, J., Jun 1988, In: Physics in Medicine and Biology. 33, 6

A matrix ionisation chamber imaging device for on-line patient setup verification during radiotherapy.

Van Herk, M., van Herk, M. & Meertens, H., Apr 1988, In: Radiotherapy and oncology : journal of the European Society for Therapeutic Radiology and Oncology. 11, 4

A liquid ionisation detector for digital radiography of therapeutic megavoltage photon beams.

Van Herk, M., Meertens, H., van Herk, M. & Weeda, J., Apr 1985, In: Physics in Medicine and Biology. 30, 4

Activities

Beyond Quantec

Marcel Van Herk (Chair)

24 Feb 2020 → 25 Feb 2020

AERO Academy Conference

Marcel Van Herk (Chair)

7 Feb 2020 → 8 Feb 2020

Data mining for adaptive radiotherapy

Marcel Van Herk (Invited speaker)

17 Jan 2020

4D Treatment Workshop for Particle Therapy 2019

Marcel Van Herk (Chair)
23 Nov 2019

George Edelstyn Lecture

Marcel Van Herk (Speaker)
4 Oct 2019

Advanced Treatment Planning

Marcel Van Herk (Member of programme committee)
22 Sep 2019 → 26 Sep 2019

Radiotherapy / Modelling and theranostics

Marcel Van Herk (Speaker)
29 Aug 2019

The 4th Christie Advanced Radiotherapy Summer School

Marcel Van Herk (Chair)
3 Jul 2019

Highlight talk: Restoring a Data General Nova computer used in the first CT scanner

Marcel Van Herk (Speaker)
18 Jun 2019

Comparing two web platforms for uncertainty simulation of external beam radiotherapy

Marcel Van Herk (Speaker)
17 Jun 2019

Dose Calculation and Optimisation

Marcel Van Herk (Speaker)
13 Jun 2019

Tools & technologies for adaptive radiotherapy

Marcel Van Herk (Speaker)
12 Jun 2019

Debate: This house believes that margin reduction is the key to improved outcome. For the motion

Marcel Van Herk (Speaker)
28 Apr 2019

Cutting Edges and Challenges: Data Sharing: Needs, Opportunities and Issues.

Marcel Van Herk (Invited speaker)
27 Mar 2019

Predicting Tumour Control and Survival: Upcoming Results on Treatment Failure and Survival

Marcel Van Herk (Invited speaker)
26 Mar 2019

IGRT for CNS and Head and Neck

Marcel Van Herk (Speaker)
20 Feb 2019

Uncertainties in image registration and contour propagation

Marcel Van Herk (Speaker)
20 Feb 2019

Technology: Planar imaging, MV and kV

Marcel Van Herk (Speaker)
18 Feb 2019

Learning from every SBRT patient treated

Marcel Van Herk (Invited speaker)
5 Oct 2018

Adaptive planning strategies - Robust & probabilistic planning - Rigid and non-rigid multimodality image registration

Marcel Van Herk (Invited speaker)
25 Sep 2018

Adaptive Radiotherapy

Marcel Van Herk (Invited speaker)
4 Jul 2018

Adaptive Radiotherapy: Adaptive RT Developments

Marcel Van Herk (Invited speaker)
Jul 2018

Radiation Oncology Physics and Systems: Learning from every patient treated

Marcel Van Herk (Keynote speaker)
Jun 2018

ESTRO 23, October 2004

Marcel Van Herk (Participant)
Oct 2004

Prizes

Breur Award

Van Herk, Marcel (Recipient), 2004

Impact Award

Van Herk, Marcel (Recipient), 19 Jun 2018

Netherlands Cancer Institute awards

Van Herk, Marcel (Recipient), 2015

Awards

Projects

15HLTO8 Consortium - EURAMET - EMPIR

Van Herk, M. & Kirkby, K.
1/06/16 → 31/05/19

A Tool for Predicting an Individual Prostate Cancer Patient's Risk of Metastasis and Need for Lymph Node Irradiation.

Choudhury, A., Kirkby, N., McWilliam, A., Van Herk, M. & West, C.

1/03/17 → 28/06/20

Advanced Radiotherapies Technologies Network (ART-NET)

Faivre-Finn, C., Illidge, T., Kirkby, K. & Van Herk, M.

1/09/16 → 31/08/21

Manchester REsearch Transforming Radiation Oncology (MAESTRO) Programme as Part of CRUK RadNet.

Bristow, R., Burnet, N., Choudhury, A., Dive, C., Faivre-Finn, C., Hagan, I., Hoskin, P., Hussell, T., Illidge, T., Kirkby, K., Kostarelos, K., O'Connor, J., Peek, N., Rattray, M., Taylor, S., Thornton, D., Van Herk, M., West, C., Whetton, A., Williams, K. & Yorke, J.

1/11/19 → 31/10/24

NIHR Biomedical Research Centre: Cancer Advanced Radiotherapy Theme.

West, C., Bristow, R., Bruce, I., Burnet, N., Choudhury, A., Evans, D., Faivre-Finn, C., Hoskin, P., Illidge, T., Kirkby, K., Kirkby, N., O'Connor, J. & Van Herk, M.

1/04/17 → 31/03/19

NIHR Manchester Biomedical Research Centre

Bruce, I., Lord, G., Lennon, R., Black, G., Wedge, D., Morris, A., Hussell, T., Sharrocks, A., Stivaros, S., Buch, M., Gough, J., Kostarelos, K., Thistlethwaite, F., Kadler, K., Barton, A., Hyrich, K., Mcbeth, J., O'Neill, T., Vestbo, J., Simpson, A., Singh, S., Smith, J., Felton, T., Murray, C., Griffiths, C., Cullum, N., Rhodes, L., Warren, R., Paus, R., Dumville, J., Viros Usandizaga, A., Keavney, B., Tomaszewski, M., Allan, S., Body, R., Cartwright, E., Heagerty, A., Kalra, P., Miller, C., Rutter, M., Smith, C., Trafford, A., Evans, D., Crosbie, E., Crosbie, P., Harvie, M., Howell, S., Renehan, A., Dive, C., Blackhall, F., Landers, D., Krebs, M., Cook, N., Clarke, R., Taylor, S., Jorgensen, C., Lorigan, P., Jayson, G., Valle, J., McCabe, M., Armstrong, A., Freitas, A., Illidge, T., Choudhury, A., Hoskin, P., West, C., Van Herk, M., Faivre-Finn, C., Bristow, R., Kirkby, K., Birtle, A., Mackay, R., Radford, J., Linton, K., Higham, C., Munro, K., Plack, C., Arden Armitage, C., Bruce, I., Moore, D., Saunders, G., Stone, M., Haddock, G., Lewis, S., Elliott, R., Green, J., Lovell, K., Morrison, A., Shaw, J., Bucci, S., Ainsworth, J., Webb, R., Newman, W., Banka, S., Clayton-Smith, J., Payne, K., Moldovan, R., Wynn, R. & Jones, S.

1/12/22 → 30/11/27

Datasets

Considerable interobserver variation in delineation of pancreatic cancer on 3DCT and 4DCT: a multi-institutional study

Versteijne, E. (Contributor), Gurney-Champion, O. J. (Contributor), van der Horst, A. (Contributor), Lens, E. (Contributor), Kolff, M. W. (Contributor), Buijsen, J. (Contributor), Ebrahimi, G. (Contributor), Neelis, K. J. (Contributor), Rasch, C. R. N. (Contributor), Stoker, J. (Contributor), Van Herk, M. (Contributor), Bel, A. (Contributor) & van Tienhoven, G. (Contributor), figshare, 23 Mar 2017

DOI: 10.6084/m9.figshare.c.3725035.v1,

https://figshare.com/collections/Considerable_interobserver_variation_in_delineation_of_pancreatic_cancer_on_3DCT_and_4DCT_a_multi-institutional_study/3725035/1

Prospective evaluation of relationships between radiotherapy dose to masticatory apparatus and trismus

Hague, C. (Creator), Beasley, W. (Creator), Garcez, K. (Creator), Lee, L. W. (Creator), Mcpartlin, A. (Creator), McWilliam, A. (Creator), Ryder, D. (Creator), Sykes, A. J. (Creator), Thomson, D. (Creator), Van Herk, M. (Creator), West, C. (Creator) & Slevin, N. (Creator), figshare, 9 Apr 2018

DOI: 10.6084/m9.figshare.6116009