

### Patient-specific in-vivo QA in MRGRT: 3D EPID dosimetry for the Unity **MR-linac**

Torres Xirau, I.

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## 10.

#### ACKNOWLEDGMENTS

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# 11.

LIST OF PUBLICATIONS

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#### This thesis is based on the following publications:

## A back-projection algorithm in the presence of an extra attenuating medium: towards portal dosimetry for the MR-linac.

Torres-Xirau I, Olaciregui-Ruiz I, Rozendaal R, González P, J Mijnheer B, Sonke J-J, et al.

Phys. Med. Biol. 2017;62:6322-6340.

DOI: 10.1088/1361-6560/aa779e

## Characterization of the A-Si EPID in the Unity MR-Linac for dosimetric applications.

Torres-Xirau I, Olaciregui-Ruiz I, Baldvinsson G, Mijnheer BJ, Van Der Heide UA, Mans A.

Phys. Med. Biol. IOP Publishing; 2018;63.

DOI: 10.1088/1361-6560/aa9dbf

#### Two-dimensional EPID dosimetry for the MR-linac: proof of concept.

Torres-Xirau I, Olaciregui-Ruiz I, van der Heide UA, Mans A.

Med. Phys. 2019; mp.13664.

DOI: 10.1002/mp.13664

#### Clinical validation 3D in-vivo EPID dosimetry in the Unity MR-linac.

Torres-Xirau I, Olaciregui-Ruiz I, Kaas J, Nowee E Marlies, van der Heide UA, Mans A.

Rad. Onc. 2020; RO-D-19-00826R2.

DOI: 10.1016/j.radonc.2020.02.010

## A Deep Learning-based correction to EPID dosimetry for attenuation and scatter in the Unity MR-Linac system.

Torres-Xirau I\*, Olaciregui-Ruiz I\*, Teuwen J, van der Heide UA, Mans A.

Phys. Medica, 2020, EJMP-D-19-00638;

DOI: 10.1016/j.ejmp.2020.02.020

#### **Other publications:**

### Fast Approximate Nearest-Neighbour Field by Cascaded Spherical Hashing

Torres-Xirau I, Jordi Salvador, Eduardo Pérez-Pellitero.

ACCV 2014; Proc. Asian Conf. on Computer Vision 2014

DOI: 10.1007/978-3-319-16817-3\_30

## Fast Super-Resolution via Dense Local Training and Inverse Regressor Search

Eduardo Pérez-Pellitero, Jordi Salvador, Torres-Xirau I, Javier Ruiz-Hidalgo, Bodo Rosenhahn

ACCV 2014; Proc. Asian Conf. on Computer Vision 2014

DOI: 10.1007/978-3-319-16811-1\_23

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#### **Conference abstracts:**

## 2016 - Towards Portal Dosimetry for the MR-linac: back-projection algorithm in the presence of MRI scanner

I. Torres Xirau, R. Rozendaal, I. Olaciregui-Ruiz, P. Gonzalez, U. van der Heide, J.J. Sonke, A. Mans;

ESTRO 35

\*Oral presentation

## 2017 - A back-projection algorithm in the presence of an extra attenuating medium: towards portal dosimetry for the MR-Linac I. Torres Xirau, R. Rozendaal, I. Olaciregui-Ruiz, P. Gonzalez, U. van der Heide, J.J. Sonke, A. Mans

Institute Quantivision Conference 2017

\*Oral presentation

## 2017 - EPID dose response in the MR-Linac with and without presence of a magnetic field

I. Torres Xirau, I. Olaciregui-Ruiz, B. J. Mijnheer, U. A. van der Heide, A. Mans

ESTRO 36

\*Oral presentation

## 2017 - Geometric validation of a 4D-MRI guided correction strategy on the MR-Linac

van de Lindt T. N., Koopman R., van de Schoot A., **Torres-Xirau I.**, van der Heide U. A., Sonke J.J.

ESTRO 36

\*Poster

#### 2017 - Towards EPID dosimetry for the MR-Linac: current status

I. Torres Xirau, I. Olaciregui-Ruiz, B. J. Mijnheer, U. A. van der Heide, A. Mans

ESTRO 1st Physics Workshop

\*Oral presentation

#### 2018 - 2-D EPID dosimetry for the MR-Linac: proof of concept

I. Torres Xirau, I. Olaciregui-Ruiz, B. J. Mijnheer, U. A. van der Heide, A. Mans

ESTRO 37

\*Oral presentation

## 2019 - Correction of EPID images in the MR-Linac using Deep learning

I. Torres Xirau, J. Teuwen, I. Olaciregui-Ruiz, U. A. van der Heide, A. Mans

Institute Quantivision Conference 2019

\*Oral presentation

#### 2019 - Pre-treatment portal dosimetry for the MR-Linac

I. Torres Xirau, I. Olaciregui-Ruiz, U. A. van der Heide, A. Mans

ESTRO 38

\*Oral poster presentation

## 2019 - Attenuation and scatter correction of portal images in the MR-Linac using Deep learning – ICCR 2019

I. Torres Xirau, J. Teuwen, I. Olaciregui-Ruiz, U. A. van der Heide, A. Mans

ICCR 2019

\*Oral presentation

#### **CURRICULUM VITAE**

My name is Iban Torres Xirau, and I was born in Barcelona on the 5th of September of 1987. I grew up in Sabadell, where I went to school and still lived during my university time. It was in 2005 when I started an integrated bachelor's and master's program in Telecommunications Engineering at the Polytechnic University of Catalonia (UPC). In the winter of 2012, as part of my degree, I applied to an Erasmus at the Technische Universität of Berlin (TUB), and for around a year I attended to several signal and image processing courses at the Computer Vision department of the TUB. Meanwhile, I also joined the Fraunhofer Institute IPK in Berlin, where I wrote my Master Thesis as a joint project between the institute, the TUB and advised by the UPC. During this period, I focused on developing an image processing software that could detect anomalies in the production of mechanical components such as screws, bolts and nuts. Then I applied for an internship as a junior researcher at the Image processing and computer vision lab of Technicolor in Hannover, where I worked for a year on topics related to image super-resolution and fast-search structures. After a very successful year at Technicolor with 2 contributions to scientific conferences, I realized I became very interested on image processing and computer vision, but most importantly on research, so I applied for a PhD at the Radiotherapy department of Netherlands Cancer Institute. This thesis describes the research conducted during this PhD on the use of EPIDs for dosimetry in the Unity MR-linac and how we paved the way from the existing back-projection algorithm for conventional linacs to the actual use of our adapted algorithm in clinical practice.

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