MR in RT

10th SYMPOSIUM

APRIL 3-5, 2024

FONDAZIONE POLICLINICO UNIVERSITARIO "A. GEMELLI" IRCCS

CENTRO CONGRESSI EUROPA
LARGO FRANCESCO VITO, 1
ROME - ITALY

SCIENTIFIC COORDINATORS: LUCA BOLDRINI, LORENZO PLACIDI

Endorsed by ESTRO

Associazione Italiana Radioterapia e Oncologia clinica

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08:00 - 09:00 Registration

09:00 - 09:20 Institutional greetings (E. Sala, M.A. Gambacorta, M. De Spirito, Italy)

SESSION 1 – INTRODUCTION TO MRI IN RT
Chairs: Maria Antonietta Gambacorta (IT), Marco De Spirito (IT)

09:20-09:40 Building clinical value with MRI in cancer care (E. Sala, Italy)

09:40-10:00 MRI based radiotherapy: clinical principles (S. Corradini, Germany)

10:00-10:20 MRI based radiotherapy: physics principles (F. Mahmood, Denmark)

10:20-10:40 How physicists see the future of MRI (U. van der Heide, The Netherlands)

10:40-11:00 Selected proferred papers:
- "Auto-segmentation for adaptive fractionated MRgRT using personalized deep learning models" (M. Kawula)
- "First MRI–guided adaptive radiotherapy on a C–arm linear accelerator" (S. Fabiano)

11:00-11:15 *Coffee Break*

SESSION 2 – BIOMARKERS IN MRI
Chairs: Gian Carlo Mattiucci (IT), Stefanie Corradini (DE)

11:15-11:35 MRI biomarkers in clinical trials: challenges and solutions (P. van Houdt, The Netherlands)

11:35-11:55 MRI radiomics for radiotherapy (N. Dinapoli, Italy)

SESSION 3 - PROFFERED PAPERS 1
Chairs: James Balter (USA), Piercarlo Gentile (IT)

11:55-12:55

- "PET/MR imaging biomarkers of radioresistance in anal cancer patients" (T. Hillestad)
- "Superior prognostic value of diffusion MRI over standard clinical information in pancreatic cancer" (A. L. H. Bisgaard)
- "Clinical validation of a prognostic preclinical MR imaging biomarker for radiotherapy outcome in head-and-neck cancer" (R. Winter)
- "Towards Quantitative Assessment of Early Radiation Therapy Response of Glioblastoma Multiforme (GBM) Using Quantitative Heterogeneity Diffusion Imaging (HDI)" (T. Zhu)
- "Finding MR-based ventilation and perfusion parameters predictive of radiation-induced pneumonitis in lung cancer patients at a 0.35 T MR-linac" (R. Klaar)
- "Comparison of Deltaradiomic Models for Prediction of Pancreatic Tumor Response Following Magnetic Resonance-Guided SBRT" (J. C Ford)

12:55-14:00 *Lunch*

SESSION 4 – CLINICAL OVERVIEW OF MRI TOOLS AND MRIgRT: PART 1
Chairs: Giuseppe Minniti (IT), Alessandra Castelluccia (IT)

14:00-14:20 MRI tools for RT in CNS malignancies (S. Gaudino, Italy)

14:20-14:40 MRI tools for RT in H&N malignancies (A. Vidiri, Italy)

14:40-15:00 MRIgRT for CNS and H&N malignancies (R. Jena, UK)

15:00-15:20 MRIgRT for upper gastro intestinal malignancies (M. Chuong, USA)

SESSION 5 – CLINICAL OVERVIEW OF MRI TOOLS AND MRIgRT: PART 2
Chairs: Luigi Natale (IT), Elia Lombardo (DE)

15:20-15:40 MRI tools for RT in lower gastro intestinal malignancies (A. Laghi, Italy)

15:40-16:00 MRIgRT for lower gastro intestinal malignancies (G. Chiloiro, Italy)

16:00-16:20 MRI tools for RT in pelvic malignancies (S. Nougaret, France)

16:20-16:40 MRIgRT in pelvic malignancies (F. Alongi, Italy)

16:40-17:00 Selected proferred papers:
- "Multiomics MR guided radiotherapy optimization in locally advanced rectal cancer: the MOREOVER Study." (I. Costamagna)
- "Quality of life and toxicity in patients with pancreatic adenocarcinoma treated on a 1.5T MR-Linac " (L. Daamen)

SPONSORED LECTURE: SESSION 1
Chair: Matteo Nardini (IT)

17:00-17:10 MRI for Radiation Therapy – The key to personalized RT - Contribution from Siemens Healthineers (N. Pineda Alonso)

17:10-17:20 Sun Nuclear: Your Trusted Partner for Patient Safety – Contribution from Mirion (A. Giallombardo)

17:20-17:30 MRI, guided radiation therapy and the quest for minimal treatment margins – Contribution from RADIUS (J. Dempsey)

Philips Ingenia MR-RT XD: dedicated for the needs of Radiation Oncology

Learn more

Locate the given words in the grid, running horizontally, vertically or diagonally. Hand in the solution at the Philips stand. Of all the good solutions, one will be drawn and win a prize.
Taking care of your patients starting with taking care of your health, especially while traveling

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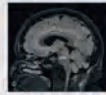
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AIR™ Recon DL

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*compared with conventional technology

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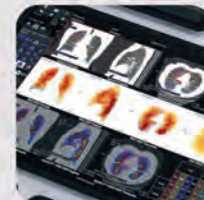
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bkFusion

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bkSpecto

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08:30-09:00 Teaching Lecture: Quantitative MRI in radiotherapy: AI tools for parameter estimation (O. Gurney-Champion, The Netherlands)

SESSION 6 - PROFFERED PAPERS 2
Chairs: Giuditta Chiloiro (IT), René Winter (NO)

09:00-10:20

- "Patterns of failure: MR-guided analysis of recurrence location after radiotherapy for head-and-neck cancer patients" (C. Raaijmakers)
- "Fully automated quality assurance for Magnetic-resonance-imaging in MR-guided-radio-therapy" (C. Beyer)
- "Diffusion-weighted imaging at a low-field MR-linac: repeatability of brain apparent diffusion coefficient measurements" (M. Rabe)
- "Towards MRI-only proton therapy for primary brain tumour patients: generating synthetic SPR maps from MRI using deep learning" (E. Alvarez-Andres)
- "Unveiling Bladder Surface Dose-Effect Relations for Acute Genitourinary Toxicity in Prostate Cancer MR-guided Radiotherapy" (Y. Lao)
- "Towards adaptive MR-integrated proton therapy for hepatocellular carcinoma" (F. Lebbink)
- "Prostate volume change during moderately hypo-fractionated RT assessed by artificial intelligence" (R. Lübeck Christiansen)
- "Response Prediction via Apparent Diffusion Coefficient Trend in Locally Advanced Rectal Cancer Patients Receiving Short Course Radiotherapy" (J. Pham)

SESSION 7 – Competing solutions for MRIgRT: DISCUSSION
Chair: Vincenzo Valentini (IT)

10:20-10:50 What's out in the market competing or surrogate of MRIgRT?
Shooters: Giulio Iachetti (IT), James Good (UK)

10:50-11:20 *Coffee Break*

SESSION 8 – FROM PRE-CLNICAL EVIDENCE TO AI
Chairs: Luca Tagliaferri (IT), Lorenzo Placidi (IT)

11:20-11:40 Evidence for biological MRI in RT (H. Lyng, Norway)

11:40-12:00 The long history of MR guidance in brachytherapy (C. Kirisits, Austria)

12:00-12:20 AI applications in MRIgRT (D. Cusumano, Italy)

12:20-12:40 QA for quantitative MRI: DWI (L. Altabella, Italy)

12:40-13:00 Selected proferred papers:
- "Quality assurance of slice thickness in motion-compensated MRI using a novel moving phantom insert" (F. van Gameren)
- "MR-guided stereotactic ablative body radiotherapy (MRgSABR) in thoracic tumours" (E. Moreno-Olmedo)

13:00-14:00 *Lunch*

SESSION 9 – MRI GUIDED PROTON THERAPY
Chairs: Daniela Thorwarth (DE), Giovanna Gagliardi (SW)

14:00-14:20 MRI guided proton therapy: prototype development and dosimetry (A. Hoffman, Germany)

14:20-14:40 MRI-only based for particle therapy: planning, beam visualization and range verification (Y. Zhang, Switzerland)

14:40-15:00 Selected proferred papers:
- "MR-integrated proton therapy – the new pinnacle in precision radiotherapy?" (E. Troost)
- "Installation and acceptance testing of a whole-body rotatable in-beam MRI system for real-time MRI-guided proton therapy" (S. Schneider)

SESSION 10 - PROFFERED PAPERS 3
Chairs: Guillaume Landry (DE), Luca Boldrini (IT)

15:00-16:00

- "Transformers for real-time 2D target tracking in MRI-guided radiotherapy" (E. Lombardo)
- "Fast high-definition 4D MRI using 3D radial kooshball acquisition with isotropic resolution and deep learning reconstruction " (V. Murray)
- "Efficient motion-compensated VMAT deliveries on the 1.5T Unity MR-linac" (P. Borman)
- "First demonstration of simultaneous delivery of raster-scanned clinical proton, helium and carbon ion treatment plans and real-time MR-imaging" (K. Milewski)
- "4D-MRI with Cartesian spirals: An alternative to radial imaging for online adaptive MR-guided radiotherapy" (B. Lecoeur)
- "MR signature matching (MRSIGMA) with adaptive motion learning for robust real-time 4D MRI on a MR-LINAC" (S. Saad Siddiq)

16:00-16:20 *Coffee Break*

SESSION 11 – MOTION MANAGEMENT AND MOVABLE TARGETS
Chairs: Davide Cusumano (IT), Faisal Mahmood (DK)

16:20-16:40 4D MRI and Motion management tools in MRIgRT (M. Fast, The Netherlands)

16:40-17:00

Selected proferred papers:
- "Kalman filter-based tracking of abdominal organ motions along the medial axis" (H. Veeraraghavan)
- "Intrafraction target motion during online adaptive radioablation of locally advanced pancreatic cancer on a 1.5 T MRI-linac" (U. Bernchou)

SPONSORED LECTURE: SESSION 2
Chair: Angela Romano (IT)

17:00-17:10 AI-Powered MR Precision Radiotherapy - Contribution from Therapanacea (N. Paragios)

17:10-17:20 New indications and treatment strategies with Comprehensive Motion Management - Contribution from Elekta (F. Alongi, M. Saracen)

17:20-17:30 Philips latest MR in RT innovations - Contribution from Philips (M. Kruiskamp)

19:00 CONFERENCE WELCOME COCKTAIL AT THE EUROPA CONFERENCE CENTRE

08:30-09:00 Teaching lecture: Clinical trials/studies for MR Linac: a review of the evidence (L. Nicosia, Italy)

SESSION 12 – INNOVATION IN MR
Chairs: Enis Özyar (TK), Luca Indovina (IT)

09:00-09:20 Ultra high Field MRI (M. Tosetti, Italy)

09:20-09:40 Innovative clinical indications (N. Andratschke, Switzerland)

09:40-10:00 Selected proferred papers:
- "MRI of pretreatment hypoxia and early response assessment in cervical cancer" (T. Hompland)
- "Feasibility of free-breathing multi-slice cardiac T1 mapping on an MR-linac" (B. Pontré)

10:00-10:15 *Coffee Break*

SESSION 13 - PROFFERED PAPERS 4
Chairs: Ruggero Ruggeri (IT), Sebastian Klüter (DE)

10:15-11:55
- "Dosimetric analysis of the use of synthetic CT images for prostate radiotherapy planning using the Acuros dose calculation algorithm" (S. af Wetterstedt)
- "Treatment field size restrictions for a novel bi-directional prototype MR-integrated proton therapy system" (B. Oborn)
- "Diffusion and echo time related ADC differences between MRI-linacs and diagnostic high gradient performance scanners – A significant source of error" (E. Palmér)
- "Clinical implementation of on-board EPI-DWI for MRI-Linac rectal cancer patient" (M. Nardini)
- "Quantification and optimization of imaging quality for small bowel tracking during MR-guided radiotherapy" (S. Damen)
- "Development and Implementation of a Novel Workflow to Measure Prostate and Lesion ADC at Multiple Treatment Timepoints" (E. Kaza)
- "Validation of a 3D cine-MRI guided MLC tracking workflow for ultra-hypofractionated prostate SBRT using scintillation-based time-resolved dosimetry" (P. Uijtewaal)
- "First pilot worldwide adaptive treatment with Comprehensive Motion Management with 1.5T MR-Linac" (L. Nicosia)
- "Time-dependent diffusion MRI as a potential quantitative imaging biomarker for radiotherapy" (M. Jokivuolle)

SESSION 14 – MRI VS CBCT: DISCUSSION
Chair: Nicola Dinapoli (IT)

11:55-12:25

Sustainability of MRgRT
Shooters: Matthias Guckenberger (CH), Rob Tijssen (NL)

SESSION 15 - PROFFERRED PAPERS 5
Chairs: Marco Felisi (IT), Matteo Mancino (IT)

12:25-13:25

- "Clinical implementation of commercial synthetic CT solution for MR-only radiotherapy for glioblastoma" (S. Emin)
- "Role of Magnetic Resonance Imaging Guided Radiotherapy (MRgRT) in the Management of Abdominal Non-Hodgkin Lymphomas"(E. Ozyar)
- "Impact of patient specific deep learning OAR segmentation on accumulated online adapted MRgRT dose" (Y. Xiong)
- "Reliability of Diffusion Weighted MRI of Human Thigh Muscles for Application of a Tumor Infiltration Model " (E. Kaza)
- "Intravoxel incoherent motion modelling of diffusion-weighted MRI using deep learning: simulations and evaluation in head and neck cancer" (M. Kåstad Høiskar)
- "The effect of magnetic field on pancreatic organoids radiosensitivity during SBRT" (E. Cesari)

13:25-13:35

Best young contribution award

SESSION 16 – CLOSING SESSION
Chairs: Luca Boldrini (IT), Lorenzo Placidi (IT)

13:35-13:45

Closing remarks

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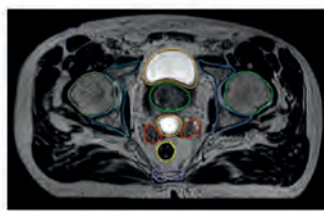
ART-Plan™:
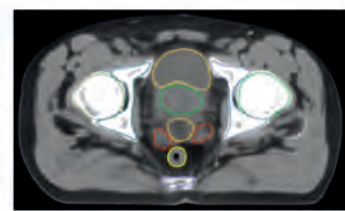# Unlock true MR-only workflow in your clinic through AI

TheraPanacea has released an AI-assisted MR-only workflow that includes automatic annotation and a deep-learning based tool for synthetic-CT generation from MR images to reduce overall treatment costs, clinician's workload, and patient exposure to ionizing radiation.

Delineate OARs on MR images → **Generate an MR-based syn-CT** → **Plan your treatment**

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Our models include:

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Clinical studies have demonstrated that dosimetric differences between planning CTs and syn-CTs were clinically insignificant for both PTVs and OARs. The results show that using ART-Plan™ for MRI-only planning is feasible for RT planning of brain and pelvis anatomies.*

Key Advantages of MR-only Radiotherapy Planning

Better soft tissue contrast for improved delineation

Reduced registration errors

Reduced patient exposure to ionizing radiation

Reduced overall treatment cost

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The course is aimed at Doctors specialising in radiotherapy and radiodiagnostics, Medical Physicists

Abstracts selection for proffered papers session

For those interested, it is possible to register by March 22, 2024 on the website of the Catholic University of the Sacred Heart: www.unicatt.it, or, directly at these links:
http://fopecom-rm.unicatt.it/fopecomonline/default_eng.aspx?Edizione=1&IdEvento=10366

The registration fees for the course are:
- Early Bird Registration: € 200,00
- Regular Registration: € 250,00
- Registration for Students (Bachelor's, Master's and PhD students: certificate required): € 100,00

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