GERMAN CANCER RESEARCH CENTER
IN THE HELMHOLTZ ASSOCIATION

Research for a Life without Cancer

Certificate of attendance

Mr. Marcin Klaczak

born on 15.07.1992 in Krakow (Polska)

successfully completed

the 3rd Virtual Summer School in Medical Physics

"Applied Computational Methods for Radiotherapy"

that took place online from September 06th to October 08th, 2021

at the German Cancer Research Center (DKFZ).

The candidate successfully passed the mandatory online test to complete the online phase.

Heidelberg, October 08th, 2021

Professor Oliver Jäkel, PhD

Partners:

HIRO Heidelberg Institute for Radiation Oncology

HEIDELBERG UNIVERSITY HOSPITAL

HEIDELBERG FACULTY OF MEDICINE

UNIVERSITÄT HEIDELBERG ZUKUNFT SEIT 1386

3rd Summer School in Medical Physics offered following learning contents:

Online Phase (pre-recorded video lectures)

(1) New trends in Computed Tomography

(2) MR Imaging and MR guidance

(3) The Medical Imaging Interaction Toolkit (MITK)

(4) Competing methods of image processing in RT

(5) Medical Image computing

(6) Digital patient twins for adaptive RT

(7) Computational Methods for Radiochemistry with applications to mini-/micro-beams and FLASH

(8) Introduction to radiobiological modelling in radiotherapy

(9) Radiomics

(10) Numerical methods & simulations for radiotherapy dose calculation and treatment planning

Live Online Sessions

(1) Computational Methods for RT – Overview

(2) Basics of Clinical Computed Tomography & The role of medical image understanding in RT

(3) Application of the linear-quadratic model & Advanced radiobiological models

(4) Introduction to Monte Carlo particle transport method & Monte Carlo applications in medical physics

(5) Inverse Treatment Planning and Optimization & Uncertainty mitigation in Radiotherapy treatment planning

Live-Online-Phase

Day 1:

- Overview on medical physics research in HD – contributing institutes
- Application and Validation of Machine Learning in Prostate MRI
- RBE-models in particle radiotherapy & Clinical application of RBE-models in particle radiotherapy

Day 2:

- Hands-on Treatment Planning: Introduction & Set-Up & IMRT: Photon dose calculation & optimization
- Hands-on: IMRT with matRad

Day 3:

- Monte Carlo (MC) in practice: simulation design, analysis and optimization
- Monte Carlo (MC) application in dose calculations, in radiobiology and radiochemistry

Day 4:

- Image registration revisited: rigid for IGRT (& GPGPU), deformable for ART, multimodal for MRgRT
- Segmentation revisited: OARs & Targets, DL-based patient model synthesis

Day 5:

- MITK Hands on: Exercises

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