

## Tuesday June 13<sup>th</sup> – Climate Planet

**18:30-21:30** Welcome reception at [Climate Planet](#), [Hack Kampmanns Pl. 3](#), between DOKK1 and Navitas

**18:30** Drinks and snacks

**19:00** Show about climate changes, from pre-industrialization to the future

**19:45** Light dinner

## Wednesday June 14<sup>th</sup> – Hotel Marselis

### **8:30** Opening session

Cai Grau, Aarhus: EPTN

Manjit Dosanjh, Geneva: ENLIGHT

### **8:50** Session 1. Radiobiology in particle therapy

Invited speakers:

**8:50 Harald Paganetti, Boston:** The need and potential for considering a variable RBE in proton therapy

**9:10 Bleddyn Jones, Oxford:** Clinical radiobiology of proton therapy: Modelling of RBE

**9:30 Radhe Mohan, Houston:** Radiobiological Issues in proton therapy

**9:50 Niels Bassler, Stockholm:** LET-painting with protons

Proffered papers:

**10:10 Armin Lühr, Dresden:** Approach to predict the relative biological effectiveness in proton therapy for clinically relevant endpoints based on clinically accessible radiation response data.

**10:20 Eivind Rørvik, Bergen:** Variation in biological dose estimates among phenomenological RBE models for proton therapy.

### **10:30** Coffee

### **11:00** Session 2. Tumor biology: genomics, biomarkers and functional imaging

Invited speakers:

**11:00 Eric Deutsch, Paris:** Neutrophils as a potential biomarker for radiotherapy?

**11:20 Daniel Zips, Tübingen:** Preclinical and clinical exploration of multiparametric functional imaging for bio-iART

**11:40 Mechthild Krause, Dresden:** Biological markers for stratification of HNSCC radiochemotherapy

**12:00 Phillippe Lambin, Maastricht:** Imaging and targeting tumour hypoxia with Hypoxia Activated Prodrugs: learning from failures

Proffered papers:

**12:20 Emanuel Bahn, Heidelberg:** Non-local repair dynamics required to explain volume effect in intestinal crypt counts

**12:30 Lydia Koi, Dresden:** RNA-profiling of micromilieu parameters in different experimental hHNSCC mode

**12:40 Michael Horsman, Aarhus:** Enhancing the radiation response of tumors but not early or late responding normal tissues using vascular disrupting agents

### **12:50** Lunch

**13:50 Session 3. Emerging technologies in ion beam therapy**

Invited speakers:

**13:50 Albert Siegbahn, Stockholm:** Experimental grid therapy with synchrotron-generated x-ray microbeams or ion beams

**14:10 Leonhard Karsch, Dresden:** Status report: Ion beam therapy based on laser plasma accelerators

Proffered papers:

**14:30 Martina Fuss, Darmstadt:** Gold nanoparticles as radiosensitizers for ion beam therapy

**14:40 Aleksandra K. Biegun, Groningen:** Calibration of X-ray CT relative proton stopping power by proton radiography in proton therapy

**14:50 Nigel Allinson, Lincoln:** Chasing the Elusive Proton CT - Recent results from the PRaVDA consortium

**15:00 Y Prezado, Orsay:** Spatial fractionation of the dose in charge particle therapy

**15:10 Ikechi Ozoemelum, Groningen:** PET imaging of short-lived nuclides during proton beam irradiation

**15:20 Johannes Müller, Dresden:** Development of an experimental setup for the integration of multi-modality imaging and photon/proton irradiation for preclinical cancer research with small animals

**15:30 Coffee**

**16:00 Session 4. Treatment planning in particle therapy**

Invited speakers:

**16:00 Christian Richter, Dresden:** Dual-energy CT for range prediction in particle therapy: What can we gain?

**16:20 Tony Lomax, Villigen:** The golden triangle of outcomes guided radiotherapy

**16:40 Mischa Hoogeman, Rotterdam:** Challenges in treatment planning for intensity modulated proton therapy

Proffered papers:

**17:00 Vicki Taasti, Aarhus:** Comparison of projection- and image-based methods for proton stopping power estimation using dual energy CT

**17:10 Jonathan Scharff Nielsen, Herlev/Lyngby:** Patch-based CT metal artifact reduction using MRI for proton and photon radiation therapy

**17:20 Per Poulsen, Aarhus:** Efficient interplay effect mitigation for proton pencil beam scanning by spot-adapted layered repainting evenly spread over the full breathing cycle

**17:30 Marta Peroni, Villigen PSI:** Shaping proton therapy dose with DTI and DSC MRI data: functional SIB and avoidance proof of concept study

**17:40 Bonny Abal, Bergen:** Plan selection in proton therapy for simultaneous treatment of the prostate, seminal vesicles and pelvic lymph nodes

**17:50 Leszek Grzanka, Krakow:** LET-painting using multiple ions

**18:00-19:10 Poster session I, at the poster stands; drinks & snacks**

**Evening on your own. Free admission at AROS Art Museum with Your Rainbow Panorama until 22:00 (ticket in conference bag).**

## Thursday June 15<sup>th</sup>

### 8:30 Session 5. Image-guidance, adaptation and motion management

Invited speakers:

**8:30 Katia Parodi, München:** Imaging for reduced range uncertainties and in-vivo verification in ion beam therapy

**8:50 Antje Knopf, Villigen:** Treating moving targets with scanned proton beams: vision of an Image-Guided Adaptive workflow

**9:10 Jan-Jakob Sonke, Amsterdam:** The MR-Linac @ NKI: research and clinical implementation

Proffered papers:

**9:30 Esben Worm, Aarhus:** Respiratory gated liver SBRT based on motion monitoring of implanted electromagnetic transponders

**9:40 Janna van Timmeren, Maastricht:** Prognostic value of longitudinal CBCT radiomics for non-small cell lung cancer patients: potential for adaptive radiotherapy

**9:50 Ditte Møller, Aarhus:** Robustness of photon and proton treatment of advanced lung and esophageal cancer against anatomical changes

**10:00 Coffee**

### 10:30 Session 6. Normal tissues, radiogenomics, PROM and modelling

Invited speakers:

**10:30 Joseph Deasy, New York:** Normal tissue probability modeling: adding genomics and patient reported outcomes to dose-volume data

**10:50 Kathrin Kirchheiner, Vienna:** Late, persistent, substantial, treatment-related, patient reported symptoms (LAPERS)

Proffered papers:

**11:10 Katherina Farr, Aarhus:** Patient reported symptoms and quality of life analysis before and after definitive chemo-radiotherapy for non-small cell lung cancer: correlation with radiation pneumonitis

**11:20 Christopher Peeler [David Grosshans], Houston:** Evaluating a model to predict post-treatment imaging changes in patients treated for brain tumors with proton therapy

**11:30 Line Schack, Aarhus:** Published biomarkers of late radiation-induced morbidity tested in prostate cancer patients

**11:40 Nina Niebuhr, Heidelberg:** Application of local effect accumulation in contrast to dose accumulation

**11:50 Jesper Pedersen, Aarhus C:** Biological dose and complication probabilities for the rectum and bladder based on linear energy transfer distributions in spot scanning proton therapy of prostate cancer

**12:00 Lunch**

### 13:00 Session 7. Adaptive radiotherapy – clinical implementation and results

Invited speakers:

**13:00 Karin Haustermans, Leuven:** How to facilitate the clinical implementation of adaptive radiotherapy?

**13:20 Richard Pötter, Vienna:** MRI based response adaptive radiotherapy in cervix cancer - volumes, doses and clinical results

Proffered papers:

**13:40 Ate Haraldsen, Aarhus:** Robustness of high FDG uptake volumes during radiotherapy in Non Small Cell Lung Cancer

**13:50 Patrick Berkovic, Liège:** Adaptive radiotherapy for locally advanced non-small cell lung cancer: Dosimetric gain and treatment outcome prediction.

**14:00 Anne Vestergaard, Aarhus:** Clinical Phase II trial in adaptive radiotherapy for urinary bladder cancer reports low acute and late toxicity rates

**14:10 Faisal Mahmood, Herlev:** Ultra-early ADC footprint successfully detects tumor irradiation and predicts radiotherapy outcome

**14:20 Christian Hvid, Aarhus:** Cone beam CT based parotid sparing adaptive radiation therapy in the head and neck region

**14:30 Coffee**

**15:00 Session 8. Radiotherapy indications, treatment volumes and fractionation (lung, rectum, anal, prostate)**

Invited speakers:

**15:00 Dirk de Ruyscher, Maastricht:** Emerging trends in radiotherapy indications, treatment volumes and fractionation in high-dose radiotherapy for lung cancer

**15:20 Vincenzo Valentini, Rome:** Emerging trends in radiotherapy of rectal cancer

Proffered papers:

**15:40 Maria Kandi, Aarhus:** Local failure after radical radiotherapy of non-small cell lung cancer in relation to the planning PET/CT

**15:50 Emely Lindblom, Stockholm:** Non-linear conversion of HX4 uptake for automatic segmentation of hypoxic volumes and dose prescription in NSCLC

**16:00 Ferenc Lakosi, Kaposvar:** HDR brachytherapy boost using MR-only workflow for intermediate- and high-risk prostate cancer patients

**16:10 Anna Kuisma, Turku:** Follow up of biologically guided radiotherapy of prostate cancer

**16:20 Vilde Skingen, Oslo:** A patient-specific tumor control probability model based on total lesion glycolysis of anal cancer

**16:30 Andrea Lancia, Rome:** Oligometastatic cancer: stereotactic ablative radiotherapy for patients affected by isolated body metastasis

**16:40-17:50 Poster session II, at the poster stands**

**19.00 Dinner (Varna Mansion, next to Hotel Marselis)**

## Friday June 16<sup>th</sup>

### 8:40 Session 9. Big data and health economics

Invited speakers:

**8:40 Yolande Lievens, Ghent:** How to guarantee the introduction and sustainability of innovative radiotherapy technologies and techniques?

Proffered papers:

**9:00 Ralph Leijenaar, Maastricht:** Development and validation of a radiomic signature to predict HPV status from standard CT imaging

**9:10 Stefan Leger, Dresden:** CT imaging during treatment improves radiomic predictions for patients with locally advanced head and neck cancer

**9:20 Marta Bogowicz, Zurich:** Comparison of PET and CT radiomics for prediction of local tumor recurrence in head and neck squamous cell carcinoma

### 9:30 Coffee

### 10:00 Session 10. Radiotherapy indications, treatment volumes and fractionation (breast, cervix, head and neck cancer)

Invited speakers:

**10:00 Jens Overgaard, Aarhus:** Radiotherapy of early breast cancer: "the 2% challenge"

**10:20 Vincent Gregoire, Brussels:** Head and neck radiation oncology: a never-ending success story...

Proffered papers:

**10:40 Jacob Christian Lindegaard, Aarhus:** Early clinical outcome of coverage probability based treatment planning in locally advanced cervical cancer for simultaneous integrated boost of nodes

**11:00 Ruta Zukauskaitė, Odense:** Distribution of loco-regional recurrences after primary IMRT for head and neck squamous cell carcinomas (HNSCC). A study from three Danish head and neck cancer centres

**11:10 Simon Boeke, Tübingen:** Patterns of loco-regional failure (LRF) in patients with hypoxic head and neck cancers (HNSCC)

**11:20 Gregers B. D. Rasmussen, Copenhagen:** Immunohistochemical and molecular imaging biomarker signature for the prediction of failure site after chemoradiation for head and neck squamous cell carcinoma

**11:30 Mette Saksø, Aarhus:** High risk of treatment failure for patients with p16-negative, FAZA-PET positive HNSCC after primary radiotherapy - update from the DAHANCA 24 trial

**11:40 Sebastian Sanduleanu, Maastricht:** Non-invasive imaging for tumor hypoxia: a novel externally validated CT-based radiomics signature

### 11.50 Conference wrap-up

### 12.00 Departure. Box lunch

## Poster discussion session I (Wednesday)

(walking through posters in five thematic groups)

### 11 Proton biology/ RBE studies

**Tordis J. Dahle, Bergen:** Sensitivity of the Microdosimetric Kinetic Model to variations in model parameters

**Steffen Nielsen, Aarhus:** Patient-specific Gene Expression Patterns Predictive of Radiation-induced Fibrosis Are Comparable After Proton Pencil Beam Scanning and Cobalt-60 Irradiation

**Jakob Ödén, Stockholm:** Will breathing motion and a variable relative biological effectiveness jeopardize the plan quality in proton radiotherapy of breast cancer?

**Silke Ulrich, Heidelberg:** Impact of respiratory motion on variable relative biological effectiveness in 4D dose distributions for protons

**Kristian Ytre-Hauge, Bergen:** Biological dose to patients receiving cranio-spinal irradiation with protons

### 12 Radiomics

**W. van Elmpt, Maastricht** [presented by **Ruben Larue**]: Influence of grey level discretization on radiomic feature stability for different CT scanners, tube currents and slice thicknesses: a phantom study

**Jurgen Peerlings, Maastricht:** Repeatability of Radiomics features derived from test-retest diffusion-weighted MR images

**Sara Carvalho, Maastricht** [presented by **Janita van Timmeren**]: FDG-PET-Radiomics of metastatic lymph nodes and primary tumor in NSCLC – a prospective externally validated study

**R.T.H.M. Larue, Maastricht:** Pre-treatment CT radiomics to predict 3-year overall survival in oesophageal cancer patients

### 13 Radiobiological/pre-clinical studies

**Thomas Wittenborn, Aarhus C:** Preclinical Investigation of Hypoxia-induced Gene Expression in Prostate Cancer Cell Lines and Xenografts

**David Grosshans, Houston:** Radiation induces age dependent deficits in cortical synaptic plasticity

**Jacob Lilja-Fischer, Aarhus:** Oropharyngeal cancer patient-derived xenografts: Characterization and radiosensitivity.

**Morten Busk, Aarhus:** Hypoxia PET imaging: combining information on perfusion and tracer retention to improve hypoxia-specificity

**Pernille Elming, Aarhus:** Combination of Vascular Disrupting Agents and Checkpoint Inhibitors: a Method of Increasing Tumour Immunogenicity?

### 14 Clinical outcomes

**Timo Deist, Maastricht:** On the selection of classifiers for outcome prediction in radiotherapy

**Jan Alsner, Aarhus:** Associations between skin toxicity, survival, and single nucleotide polymorphisms in head and neck cancer patients receiving the EGFR-inhibitor Zolatumumab: Results from the DAHANCA 19 trial

**Einar Dale, Oslo:** Dose painting for reirradiation of head and neck cancer

**Simon Lønbro, Aarhus:** Immediate loss of lean body mass in locally advanced head and neck cancer during (chemo)-radiotherapy.

**Arthur Jochems, Maastricht:** A random forest model to predict early death in NSCLC patients receiving chemo(radio)therapy

**Tinne Laurberg, Aarhus:** Intrinsic subtype classification of local recurrences and new contralateral primary tumors in patients with low risk breast cancer. Influence of age and primary surgery.

**Oscar Casares-Magaz, Aarhus:** The association between genitourinary toxicity and planned vs delivered bladder dose/volume metrics in radiotherapy for prostate cancer

**Lotte Fog, Copenhagen:** Early pain relief and toxicity after image guided volumetric modulated radiation therapy for spinal cord compression

### **15 Proton therapy: Dosimetry and Treatment planning**

**Ellen Marie Høye, Aarhus:** Saturation dose and quenching in proton beams in a radiochromic 3D dosimeter

**Jeppe Brage Christensen, Roskilde:** On the potential of proton dosimetry using Cerenkov radiation in optical fibers

**Thomas Henry, Stockholm:** Proton grid therapy (PGT) with mm-wide beam elements: a Monte-Carlo simulation study

**Gracinda Mondlane, Stockholm:** Evaluation of TCP and NTCP after radiosurgery of liver metastases with photon- or scanned proton-beams

**Camilla Hanquist Stokkevåg, Bergen:** Normal tissue sparing in very young children treated with proton therapy

**Laura Toussaint, Aarhus:** Doses to brain structures associated with cognitive impairment following radiotherapy of paediatric CNS tumours with contemporary photon vs. proton techniques

**Charlotte Espensen, Copenhagen:** Ruthenium-106 brachytherapy and proton therapy for uveal melanomas: Biologically Effective Dose for tumour and organs at risk from comparative dose planning

## **Poster discussion session II (Thursday)**

**(walking through posters in five thematic groups)**

### **16 Functional imaging: PET and SPECT**

**Evelyn de Jong, Maastricht:** Quality assessment of [18F]FDG PET scans of the NVALT12 imaging sub-study: Recommendations for future multicenter PET trials

**Marta Lazzeroni, Stockholm:** Evaluation of third treatment week as temporal window for assessing responsiveness on repeated FDG-PET scans in NSCLC patients

**Aniek Even, Maastricht:** Predicting hypoxia in non-small cell lung cancer: combining CT, FDG PET and dynamic-contrast enhanced CT parameters

**Ingild Støen, Oslo:** Optimal threshold for PET-based autocontouring of boost volume for radiotherapy of anal carcinoma

**Espen Rusten, Oslo:** The prognostic value of FDG-PET uptake parameters in anal cancer

**Mette Marie Fode, Aarhus:** Functional treatment planning using 2[18F]fluoro-2-deoxy-D-galactose PET/CT for stereotactic body radiotherapy of liver metastases – a phase I study

**Azadeh Abravan, Oslo:** PET based evaluation of lung toxicity after radiotherapy- Assessment of two approaches for dose response evaluation

**Tine Bisballe Nyeng, Aarhus:** Comparing functional lung volumes obtained by using 2 different methods: Do perfusion SPECT and 4D-CT ventilation maps define the same voxels in lung cancer treatment?

### **17 Photon therapy: Inter-fractional challenges**

**Kristina Giske, Heidelberg:** In-silico patient models: beyond contour propagation in radiation therapy

**Anne Holm, Aarhus:** Carotid sparing intensity modulated radiotherapy for early laryngeal glottis cancer; What is clinically achievable?

**Lone Hoffmann, Aarhus:** Anatomical changes in advanced lung cancer patients occurring during RT can be predicted from pre-treatment characteristics.

**Karen Zegers, Maastricht [presented by Jose Baeza]:** 3D dose evaluation in breast cancer patients to define parameters for adaptive radiotherapy

**Karina Lindberg Gottlieb, Odense:** A new adaptive position verification protocol for breast cancer with simultaneous boost

**Annette Schouboe, Aarhus:** Full bladder approach sparing bowel in external radiotherapy for cervical cancer patients

**Akos Gulyban, Liege:** Margin of the day with ITV concept during EBRT for locally advanced cervical cancer: Evaluation of 0, 5 and 10 mm safety margins with dose accumulation uncertainty

**Marianne Sanggaard Assenholt, Aarhus:** Bladder filling feed back and CBCT monitoring during external beam radiotherapy with tight margins for patients with locally advanced cervical cancer.

#### **18 Photon therapy: Intra-fractional challenges**

**Ander Biguri, Bath** [presented by **Steven Hancock**]: Improving image quality of 4D-CBCT respiratory-correlated and motion-corrected reconstruction using iterative algorithms and GPU acceleration

**Mai Lykkegaard Schmidt, Aarhus:** Intrafraction baseline shifts between setup CBCT and treatment delivery of involved mediastinal lymph nodes of lung cancer patients

**Patrik Sibolt, Roskilde:** Monte Carlo evaluation of dose-escalated lung radiotherapy in free-breathing and deep-inspiration breath-hold

**Marianne Knap, Aarhus:** Difference in target volume using three different methods to include respiratory uncertainty in advanced lung cancer

**Susanne Bekke, Herlev** [presented by **Faisal Mahmood**]: Non-interchangeability of respiratory gating areas using surface scanning in deep inspiration breath-hold radiotherapy

**Jenny Bertholet, Aarhus:** Validation of a fully automatic real-time liver motion monitoring method on a conventional linac

**Simon Skouboe, Aarhus:** Real-time gamma evaluations of motion induced dose errors as QA of liver SBRT tumour tracking

**Camilla Skinnerup Byskov, Aarhus:** Intra- vs. inter-fractional target motion in radiotherapy of rectal cancer evaluated with repeat volumetric imaging

#### **19 Proton therapy: Inter- and intra-fractional challenges**

**Stine Korreman, Aarhus:** Minimum prescription concept for dose painting with protons increases robustness towards geometrical uncertainties

**Kia Busch, Aarhus:** On-line dose-guided proton therapy to account for inter-fractional motion: a proof of concept

**Maria Fuglsang Jensen, Aarhus:** Optimizing delivery speed of lung cancer treatments using single and multi field intensity-modulated proton therapy

**Emma Colvill, Aarhus:** Validation of fast motion-including dose reconstruction for proton scanning therapy in the liver

**Thomas Berger, Aarhus:** Dosimetric impact of air cavities and weight loss with intensity modulated proton therapy in locally advanced cervical cancer patients.

**Toke Printz Ringbæk, Gießen:** Evaluation of new 2D ripple filters in scanned proton therapy.

#### **20 Functional imaging: MRI**

**Ane Iversen, Aarhus:** Functional imaging of cancer metabolism using hyperpolarized <sup>13</sup>C magnetic resonance spectroscopy to monitor the effect of vascular disrupting agents

**Jesper Kallehauge, Aarhus:** Comparison of common approaches for DCE-MRI analysis in cervical cancer

**René Winter, Tübingen:** Simultaneous PET/MRI in radiotherapy treatment position: Diffusion-weighted imaging in head and neck cancer

**Morten Bjoern Jensen, Aarhus:** Diffusion Tensor Imaging driven growth modelling for target definition in gliomas



## Posters – on general display

**Erik Pedersen, Aarhus:** Real-time magnetic resonance imaging of the simultaneous motion of lung tumors and metastatic mediastinal lymph nodes

**Anders Traberg Hansen, Aarhus:** Isotoxic treatment planning strategies for stereotactic liver irradiation: The price of dose uniformity

**Jasmin M. Mahdavi, Herlev** [presented by **Faisal Mahmood**]: Critical dose reduction effect of unwanted air gaps under bolus in volumetric modulated arc therapy

**Helena Sandström, Stockholm:** Multi-institutional study of the variability in target delineation for six targets commonly treated with radiosurgery

**Christian Rønn Hansen, Odense:** Automatic treatment planning facilitates fast adaptive re-planning for oesophageal cancer treatments

**Chris Monten, Ghent:** Prone breast irradiation: Can we improve precision and accuracy of tumor bed delineation?

**Cecile Wolfs, Maastricht:** Dosimetric consequences of simulated anatomical changes in lung cancer patients

**Yvanka van Wijk, Maastricht:** Development of a virtual spacer for a multifactorial decision support system for prostate cancer radiotherapy: Comparison of dose, toxicity and cost-effectiveness

**Iosif Papoutsis, Oslo:** From dose prescription to dose delivery - can dose painting by numbers be accurately delivered?

**Paulo Magalhaes Martins, Heidelberg** [presented by **Paulo Crespo**]: Fast full-body reconstruction for a functional human RPC-PET imaging system using list-mode simulated data and its applicability to radiation oncology and radiology

**Jose A Baeza Ortega, Maastricht:** Validation and uncertainty analysis of a pretreatment prediction model for EPID dosimetry

**Ebbe Lorenzen, Odense** [presented by **Karina L. Gottlieb**]: Automatic treatment planning of FFF VMAT for breast cancer: fast planning and fast treatment

**Esben Svitzer Yates, Aarhus:** Total Body Irradiation – patient in vivo dosimetry.

**Marie Louise Milo, Aarhus:** Pectus excavatum and adjuvant radiotherapy for early breast cancer: is the heart an issue?

**Manjit Dosanjh, Geneva:** Collaborative strategies for meeting global needs for affordable, high quality radiation therapy (RT) treatment

**Maja Sharma, Aarhus:** Simultaneous integrated prophylactic cranial irradiation in sino-nasal cancer