

# HYPERBOOST

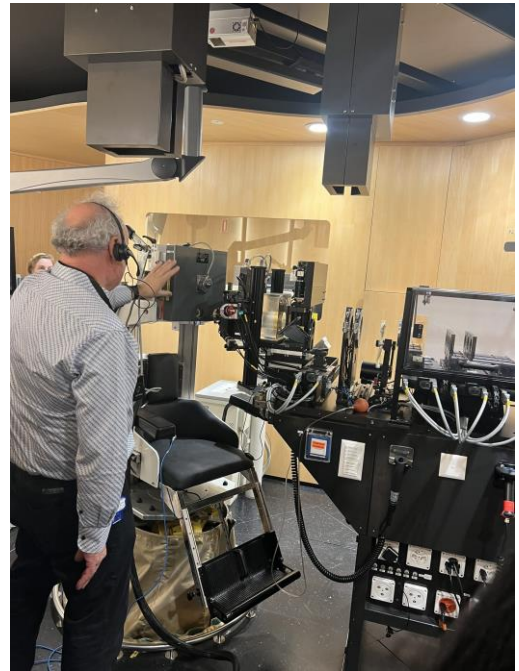
Boosting the effect of Radiotherapy

## What happened since the last Newsletter?

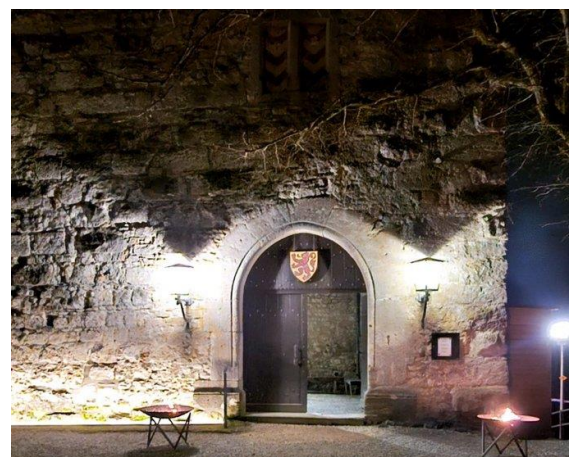
The last newsletter was posted some time ago (apologies!), and since May a lot happened in the Hyperboost project! Many fellows went on secondments and presented their results on conferences. In this newsletter you can read the experiences from Adela Ademaj, (one of our first fellows to finalize her thesis soon) on her secondments and the meetings where she presented her results. Also some pictures of fellows presenting their Hyperboost work. And we start with a report on our fifth training week and consortium meeting in Aarau/Winterthur.

## Fifth training week/consortium meeting

The fifth Hyperboost training week took place partly online (January 8-10) and partly onsite in Winterthur, Switzerland (February 14) followed by the second live annual Hyperboost meeting with fellows and PIs on February 15-16, 2024. This will be the last live meeting organized by Hyperboost. During the last training day which included a visit to KSA, the fellows had an official recording session of short presentations where they presented their work (more on that later), and visited the nearby breath-taking Paul Scherrer proton therapy center (PSI).



In the evening they had an amazing dinner in the Habsburg castle near Zurich, Switzerland.





The following two days were filled with presentations of all fellows to present and discuss their research results in the fields of clinical studies, biological effects and physics. It is great to see how the project and the skills of the fellows developed in the last three years. It was an excellent Consortium Meeting of our Hyperboost training network at ZHAW Zürcher Hochschule für Angewandte Wissenschaften in Winterthur and at Kantonsspital Aarau AG. Thank you very much to both institutions for hosting and supporting this Consortium Meeting. We can be very proud of what has been achieved and are looking very much forward to continue our fruitful collaboration within this excellent international network in the future.



## Adela Ademaj in Amsterdam

Following the completion of the fourth week of Hyperboost training in Erlangen, I returned to Amsterdam to resume my secondment at Amsterdam UMC. During my second secondment, I conducted in-vitro experiments to explore how temperature variations, time intervals, and treatment sequencing influence the radiosensitization effects of combining hyperthermia with radiotherapy in rectal cancer cells. This work was designed as a continuation of my first secondment from July 1 to August 15, 2022. During this period, I acquired skills in conducting in-vitro experiments and gained valuable experience, thanks to the unwavering support of Dr. Hans Crezee, Dr. Arlene Oei, and Mei Xionge. Their consistent assistance enabled me to independently carry out my experiments five months later during my second secondment.

In June, I also went on a short visit to Erlangen University Hospital with the goal of understanding the analysis of the HyRec trial, establishing the database, and collecting data for our ongoing multinational clinical study, 'Hyperboost REC.' Although the duration of my visit was short, I gained valuable insights and knowledge, for which I am appreciative of the research and clinical group in Erlangen.

In addition, in the Winter Semester 2022, Associate Professor Dr. Hana Trefna kindly agreed to allow me to give lectures at Chalmers University of Technology, enabling me to acquire essential teaching experience during my PhD. Our positive collaboration allowed me to not only give presentations for bachelor and master students but also become a supervisor of six bachelor students for their thesis titled "Medical Image Registration and Segmentation



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for Hyperthermia Treatment Plan" at Chalmers University of Technology during the Spring Semester of 2023.



Finally, the Hyperboost group from KSA had the opportunity to present the latest research results of the project at SASRO 2023 and ESHO 2023 conferences. Additionally, our recent work titled was selected for presentation at the ESTRO conference which will be held in Glasgow on 3-7 May 2024.

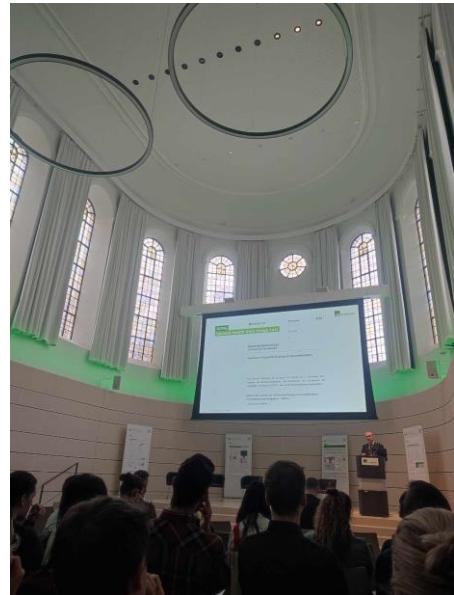


I also received an invitation to give a presentation at the SSRMP Applied Medical Physics Meeting in Bern on December 15, 2023. At the meeting, I not only delved into the fundamentals of hyperthermia treatment but also presented a comprehensive update on my

PhD project, emphasizing its pivotal role in the future of hyperthermia as a clinical cancer treatment.

### Spiros in Munich

One of our other fellows, Spiros Karkavitsas was able to go to a symposium on "AI and Data Science at the Medical Faculty" in Munich and present his work with a poster presentation.



## New Hyperboost publications

Stutz E, Puric E, **Ademaj A**, Künzi A, Krcek R, Timm O, **Marder D**, Notter M, Rogers S, **Bodis S**, et al. Present Practice of Radiative Deep Hyperthermia in Combination with Radiotherapy in Switzerland. *Cancers*. 2022; 14(5):1175.

<https://doi.org/10.3390/cancers14051175>

**Wust P, Veltsista PD**, Oberacker E, Yavvari P, Walther W, Bengtsson O, Sterner-Kock A, Weinhart M, Heyd F, Grabowski P, et al. Radiofrequency Electromagnetic Fields Cause Non-Temperature-Induced Physical and Biological Effects in Cancer Cells. *Cancers*. 2022;14(21):5349.

<https://doi.org/10.3390/cancers14215349>

**Ademaj A**, Puric E, Timm O, Kurti D, **Marder D**, Kern T, Hälg RA, Rogers S, **Riesterer O**. Real World Analysis of Quality of Life and Toxicity in Cancer Patients Treated with Hyperthermia Combined with Radio(chemo)therapy. *Cancers*. 2023;15(4):1241.

<https://doi.org/10.3390/cancers15041241>

Gehre Simon, Meyer Felix, **Sengedorj Azzaya**, Grottker Fridolin, Reichardt Clara M., Alomo Jannik, Borgmann Kerstin, **Frey Benjamin**, **Fietkau Rainer**, Rückert Michael, **Gaipl Udo S**, Clonogenicity-based radioresistance determines the expression of immune suppressive immune checkpoint molecules after hypofractionated irradiation of MDA-MB-231 triple-negative breast cancer cells. *Frontiers in Oncology* 13: 981239 (2023).

<https://www.frontiersin.org/journals/oncology/articles/10.3389/fonc.2023.981239>

Jannik Walter, Michael Hader, **Azzaya Sengedorj**, **Rainer Fietkau**, **Benjamin Frey** & **Udo S. Gaipl** (2023) Broadband microwave

spiral applicator (105–125 MHz) for in vitro examinations of hyperthermia-induced tumor cell death forms – first analyses with human breast cancer cells, *International Journal of Hyperthermia*, 40(1): 2265590, DOI: 10.1080/02656736.2023.2265590

**Mattia De Lazzari**, Anna Ström, Laura Farina, Nuno P. Silva, **Sergio Curto & Hana Dobšiček Trefná** (2023) Ethylcellulose-stabilized fat-tissue phantom for quality assurance in clinical hyperthermia, *International Journal of Hyperthermia*, 40(1): 2207797, DOI: 10.1080/02656736.2023.2207797

**Carolina Carrapiço-Seabra**, **Mattia De Lazzari**, Abdelali Ameziane, **Gerard C. van Rhoon**, **Hana Dobšiček Trefná & Sergio Curto** (2023) Application of the ESHO-QA guidelines for determining the performance of the LCA superficial hyperthermia heating system, *International Journal of Hyperthermia*, 40(1): 2272578, DOI: 10.1080/02656736.2023.2272578

Saha N, Millward JM, Herrmann CJJ, **Rahimi F**, Han H, Lacour P, Blaschke F, **Niendorf T**. High-Fidelity 3D Stray Magnetic Field Mapping of Smartphones to Address Safety Considerations with Active Implantable Electronic Medical Devices. *Sensors*. 2023; 23(3):1209. <https://doi.org/10.3390/s23031209>

**Adela Ademaj**, Emsad Puric, **Dietmar Marder**, Olaf Timm, Thomas Kern, Roger A. Hälg, Susanne Rogers & **Oliver Riesterer** (2023). Radiotherapy combined with deep regional hyperthermia in elderly and frail patients with muscle-invasive bladder cancer: quality analysis of hyperthermia and impact on clinical results, *International Journal of Hyperthermia*, 40(1):2275540, DOI: 10.1080/02656736.2023.2275540



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**H. Petra Kok, Timoteo D. Herrera, Johannes Crezee** (2024) Biological treatment evaluation in thermoradiotherapy: application in cervical cancer patients, Strahlentherapie Onkologie. DOI: 10.1007/s00066-023-02185-4.

## Prizes

Danai Paraskevi Veltsista got the "Young Investigator Award" during ESHO 2023 in Cologne for the poster presentation under the name "Hyperthermia in the treatment of high-risk soft tissue sarcomas: a systematic review".

**For more information on the network and topics/input for the next newsletter** please contact the project manager (Laurian Jongejan);

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Consortium Member	Short Name	Dept./Division/Laboratory
<b><u>Beneficiaries</u></b>		
Academic Medical Center Amsterdam, The Netherlands	AMC	Dept Radiotherapy and Center for Experimental Molecular Medicine
Aarhus University, Denmark	AU	Dept Experimental Clinical Oncology
University of Zurich, Switzerland, grantholder for Cantonal Hospital Aarau	UZH	Radio-oncology Department
Universitäts-klinikum Erlangen, Germany	UKER	Department of Radiation Oncology
Zurich University of Applied Sciences, Switzerland	ZHAW	Institute of Applied Mathematics and Physics
Dr. Sennewald Medizintechnik GmbH, Munich, Germany	SMT	Expertise: devices for hyperthermia
Medlogix Rome, Italy	ALBA	Expertise: devices for hyperthermia
Charité – Universitäts-medizin Berlin, Germany	CUB	Department of Radiation Oncology
Chalmers University of technology Göteborg, Sweden	CUT	Signals and systems
Erasmus Medical Center Rotterdam, The Netherlands	EMC	Department of Radiation Oncology
Max-Delbrück Center for Molecular Medicine in the Helmholtz Association, Berlin, Germany	MDC	Berlin Ultrahigh Field Facility
LMU Klinikum Munich	<u>LMU</u>	hyperthermia group
<b><u>Partner Organisations</u></b>		
Duke University Medical Center, USA	DUMC	Dept of Radiation Oncology
European Society for Radiotherapy & Oncology	ESTRO	Education and Science
European Society for Hyperthermic Oncology	ESHO	n/a
RaySearch Laboratories AB (publ), Stockholm, Sweden	RAY	Chief Science Officer
University of Amsterdam	UvA	Doctorate Board, Rector's Office
MRI.Tools GmbH	MRIT	Chief Science Officer



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