# HYPERBOOST
Boosting the effect of Radiotherapy

**What is Hyperboost?**

Hyperboost 'Hyperthermia boosting the effect of Radiotherapy' is a large international consortium consisting of 11 institutes in 6 countries, that received funding from the H2020 Marie Skłodowska-Curie programme. A full list of participants and partners can be found at the end of this newsletter. Hyperboost aims to deliver a new generation of professionals with the skills and expertise to coordinate, develop, apply and optimise advanced multi-modality cancer treatments, and in particular the combination of radiotherapy with hyperthermia, heating the tumour to 40-44°C. Thermal treatments using hyperthermia at 40-44°C have profound biological and clinical effects, are successfully used as cancer treatment combined with radiotherapy and chemotherapy, and its benefits could be further enhanced by optimally exploiting the synergy between these two modalities.

The multidisciplinary HyperBoost team will develop an advanced personalised treatment planning platform for hyperthermia combined with radiotherapy based on extensive preclinical and clinical data. To this end HyperBoost unites an exceptional faculty at hospitals, universities and companies, representing a diverse and unique blend of international leaders in their fields, and excellent investigators at various career stages. The program and the newly trained professionals will develop more effective clinical treatments, boost healthcare entrepreneurs in novel technology, thus ultimately benefitting more patients across Europe. Their skill set will not only benefit the clinical impact of radiotherapy combined with hyperthermia, but also multi-modality oncological strategies in general.

**Launch of the website of the Hyperboost network September 2020**

The website of the Hyperboost network was launched online from mid-September 2020 and we are continuing to improve it (https://hyperboost.eu/). The main purpose of the website in the first important period of the network was to attract future Hyperboost ESRs to the website and inform them on the possibilities in the Network. Under vacancies we explained the recruitment procedure and showcased all projects. Here applicants could also find the online application form, designed to pre-select according to the EU eligibility rules.

Furthermore, news on the beneficiaries and partners, principal investigators (and later the fellows), meetings and courses will all be posted on the website.

**Great interest in the Hyperboost Network worldwide!**

The recruitment of the Hyperboost network started officially September 2020. With a targeted social media campaign and strict

deadlines, we received 160 applications before the first deadline of October 16th. Although we prolonged the deadline several times in order to attract more candidates (as not all positions are filled), we have currently received 252 applications. We did start with first and second round interviews after November 1st and we managed to fill 12 positions, hoping to fill the last 2 positions soon. We managed to attract a great diversity of applicants (Figure 1). Please visit our website (Fellows (hyperboost.eu) to already meet our fellows and read about their personal background.

**Kick-off meeting of the Hyperboost Network!**

January 28th 2021, we had a kick-off meeting for the project, unfortunately due to coronavirus restrictions this had to be done online. All fellows that had been recruited at the time were also present. After starting with a general introduction and some administrative issues, we continued with presentations per work package, introducing the people and planned research. Although this meeting was useful and interesting, we hope to be able to have a physical kick-off meeting at the end of 2021, start of 2022, when all ESRs have been recruited.

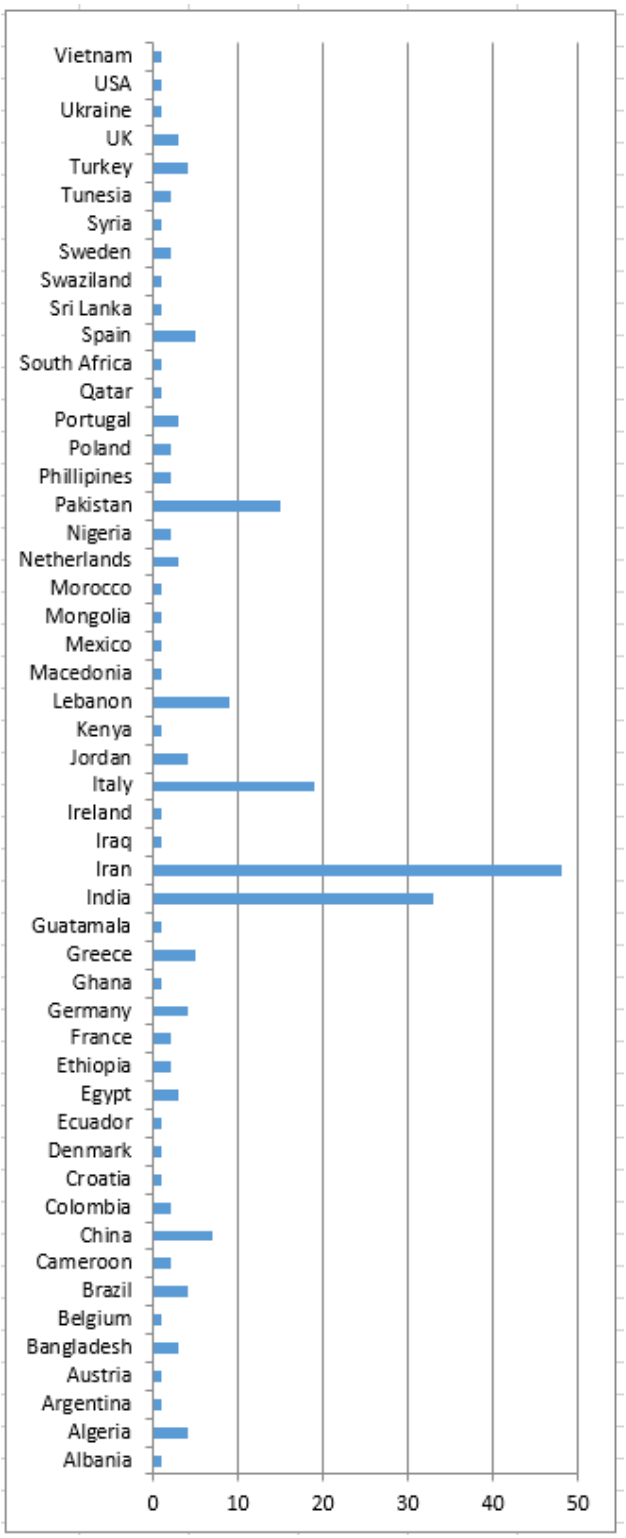



***Figure 1.*** *Country of birth of Hyperboost applicants*

**Introducing the first Hyperboost fellows;**

Although not all ESRs have started yet, we will already introduce some of them below. More will follow in the next newsletter!

## ESR4, Azzaya Sengedorj

My name is Azzaya Sengedorj. I come from Mongolia. I obtained my bachelor's degree in Medical Science at the Mongolian National University of Medical Sciences and graduated as a medical doctor and worked for a short time. After that I studied at the Grenoble INP University of Grenoble Alpes and obtained my master's degree in Nanomedicine, working on the preclinical evaluation of organotypic tissue slice cultures to monitor anti-cancer drug therapy on metastatic renal cancer cells.

Now I am working in the Universitätsklinikum Erlangen, Germany, in the Translational Radiobiology Group at the Department of Radiation Oncology. My PhD work focuses on the effect of Hyperthermia in combination with Radiotherapy on the innate and adaptive immune system considering particularly the sequence, timing, dose and amount of the applications. I am mainly working with preclinical model systems of breast cancer. Currently I am studying the effect of Hyperthermia alone with different temperatures and in combination with radiotherapy on the activation state of human dendritic cells which are the key players linking the innate and adaptive immune system.

Of course, for me first it was hard to adapt. I was moving into a new country and to a new environment in the midst of a pandemic. But my colleagues and my working group welcomed me with warm heart. Now thanks to the increasing number of vaccinated people the social life is becoming more and more normal and people are starting to enjoy their normal life.

I am really happy to be a part of this project with talented young researchers from multidisciplinary field. Since we are all studying to improve the Hyperthermia treatment from different aspects, I think it is a really good and promising approach. I am really looking forward to meet the other fellows especially those who are working with the preclinical evaluation to share my experience and findings and learn new things from them.

I am also really looking forward to create a collaboration with the other working groups. I think the great advantage of this project is we have international working groups working in different countries and we each have different experience and approach to the same goal. I think in order to improve our work we should use this opportunity and work together to solve our challenges.

*Together with Rupali, my fellow ESR in Erlangen*

## ESR5, Sergio Mingo Barba

I am from Madrid (Spain) where I studied my bachelor in Physics. Then, I studied my MSc in Nuclear Physics in an Erasmus Mundus programme between Italy, France and Spain.

Now, I am living in Winterthur (Switzerland). However, in October, I will do my first secondment and I will go to Amsterdam to work in the biology labs. My research is based on the study of a biological model called the MHR model. Right now, my efforts are focused on studying how to properly calibrate this model and how it can be expanded so we can have a better understanding of the biological dynamics.

Starting a new life in a new country is always amazing. Luckily, the COVID situation in Switzerland was not too bad, so I was able to enjoy my first months here. Moreover, I am very happy with my supervisor and my colleagues who had helped me as much as they can.

I expect from this programme that it allows me to develop my skills and to work with people from different fields. I love to know people from different places and I hope that I will be able to meet all of the ESRs. Workwise, I expect to continue as I am now: learning a lot from different disciplines and improving as a scientist. Personally, I would like to make a lot of friends, travel as much as possible and have awesome experiences.

## ESR8, Patricia Enriquez Calzada

I am a biomedical engineer from Madrid. I studied my bachelor's there, with one year abroad in the US. Then, I did my masters with specialization in medical physics in Delft, The Netherlands.

Three months ago, I moved to Rome to participate in The Hyperboost as ESR8 in the company Med-logix. My projects will be to create an interface for hyperthermia treatment planning (HTP) with the objective to integrate it to normal radiotherapy treatment planning and be able to calculate the integral dose patients would receive after the joint treatment.

Even though Italy is very similar to Spain, after almost 3 years in the Netherlands I had a strong cultural shock when arriving in Rome. Benefits and drawbacks of the place are completely inverted. Less efficiency, but more pasta now.

I expect to grow as much as I can personally and professionally in these 3 years. I am looking forward to collaborating with the other ESRs and for mobility to be easier so we can have meetings in person soon.

## ESR9, Mattia De Lazzari

Hello! My name is Mattia. I'm 25 years old and I'm native of Piombino Dese, a little town in the Venetian inland, in Italy. I got both my bachelor's in biomedical engineering and the master's degree in bioengineering from the University of Padova, in 2018 and 2020 respectively. After my graduation, in January this year I moved to Göteborg, in Sweden, to pursue a PhD within the Hyperboost project, at Chalmers University of Technology.

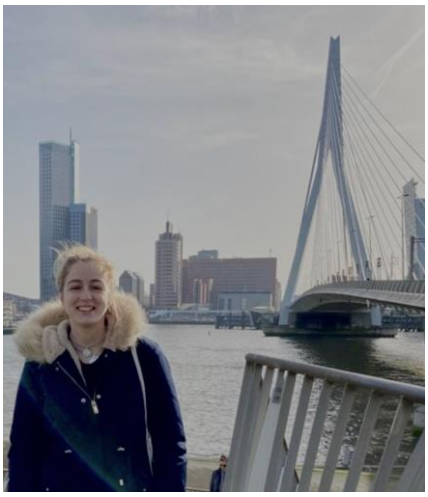
The principal and ultimate aim of my PhD project is the development of new Quality Assurance guidelines for Clinical Hyperthermia, which can be implemented by several clinics and centers. Six months are already passed since I've began living this "new chapter" of my life. Fortunately, I'm not new to Göteborg. In fact, during my master I had the opportunity to spend one semester at Chalmers thanks to the Erasmus+ program, and this made the moving a little bit easier. Beside this, the measures adopted here in Sweden to prevent the spreading of the new coronavirus gave me the possibility to meet, since the really beginning, my supervisor and some of my colleagues. Most of the work in these first months was done from home, and this, at the beginning, perhaps made it a little difficult for me to understand what the first steps were and to set goals, in the short term. However, I was supported in this by my supervisor Hana, whom I thank.


Now that the pandemic is improving, I'm looking forward for the Hyperboost network activities. I hope that these will not only represent opportunities for educational and professional growth, but also give me the opportunity to come into contact with other ESRs and with experts and researchers from whom I can draw valuable insights.

## ESR10, Carolina Seabra

I was born and raised in Lisbon, Portugal. I graduated as Biomedical and Biophysics Engineer in 2019 at the Faculty of Sciences,

University of Lisbon, in Portugal. During my masters, conducted in collaboration with the Champalimaud Foundation, both my knowledge in deep learning for medical applications and my interest in research developed. This specific interest led me to the Netherlands, just before the pandemic hit. Having to start a completely new job and new field is, per se, already a challenge, but without being able to get as much support from other people was, definitely, not easy. The initial impact to a new city, group of people and language was also challenging, but at the end all went well and I enjoyed and keep on enjoying every single part of the adventure. Currently, I am in the Radiotherapy Department of Erasmus MC, specifically within the Hyperthermia unit, where I started my PhD research in mid-January 2021. Being part of the Hyperboost project is such a privilege, specially to work with such important names within the field and to be able to learn from them. The interactions between different students, from multiple research groups and different institutes are, absolutely, rewarding and stimulating not only, in a professional point of view, but also in a personal one.



## ESR11, Rupali Khatun

I am Rupali Khatun, I am from India. I did my Master in Computer application in 2018 from Amity university, Kolkata, India. My Master's project was mainly focused on segmenting tumour and non-tumour gland using Machine Learning. After finishing my Masters, I worked as an Investigator in the Computer Vision Centre (University Autonomous Barcelona, Spain), working with the food image recognition; in order to classify and extract knowledge of what we are eating, what are the ingredients present in our food on daily basis, in order to calculate the amount of nutrition a plate of food contains and help the doctors to monitor their patients' diet. Additionally, I have 3.5 years of development and entrepreneurship experience in ASP.NET and related technologies.

I have joined the Translational Radiobiology Group at the Department of Radiation Oncology of the Universitätsklinikum Erlangen as a PhD student in April 2021. My PhD work focuses on monitoring immune effects of hyperthermia in multimodal settings with radiotherapy in patients and on definition of prognostic and predictive markers. Right now, I am mainly cleaning the MR data we have from temperature monitoring during hyperthermia treatment and create a database. One focus will be the improvement of MR images for thermometry during hyperthermia treatment and understanding the temperature distribution of hyperthermia cancer treatment. This might additionally help to predict treatment responses in dependence of homogeneous and heterogenous temperature distribution in the future.

Moving from one country to another during pandemic wasn't easy, new country, new environment, new language, all together it was bit overwhelming. But my supervisors and colleagues really helped me a lot with everything. Everyone in our lab is very welcoming, helpful, friendly, which helped me to stay positive all the time 😊.

It is a great pleasure for me to be a part of this project with all the dynamic, talented and young researchers from multidisciplinary field. I believe hyperboost will give all of us a wide range of knowledge and expertise to full fill our goal of improving the hyperthermia treatment from different aspects.

I am really looking forward to meet the other fellows and get the opportunity to share our knowledge and experiences with each other and come up with great ideas and also to help each other with our respective challenges.

ESR13, Veltsista, Paraskevi Danai

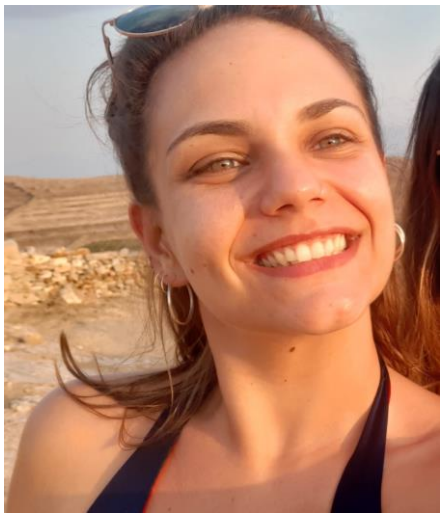
My name is Paraskevi Danai Veltsista (family, friends and colleagues call me Danai), I am 28 (29 in December but obviously I cannot comply with this) and I am coming from Greece. I have studied Chemistry at the University of Patras (Greece) and I have obtained my Master's in Oncology at Vrije University of Amsterdam.

Currently, I am living in Berlin and I am doing my PhD at Charité as a HYPERBOOST fellow. The aim of my project is the optimization of the technical and clinical hyperthermia treatment quality. In order to achieve this, we are gathering clinical data that will help us to identify the parameters that affect the quality of the treatment. Based on that data, we will be able to establish optimized treatment protocols and efficiently contribute to the European multicentric clinical study.

Starting a new life, with a new job, in a new country it is definitely not the easiest thing in the world and pandemic made it a little bit more challenging, but for sure it was (and it still is) exciting. Having experienced living abroad before, made my integration to this new environment smoother and faster, but leaving my family and friends behind amidst the pandemic was really difficult and frightening.

My expectations from Hyperboost are mainly to learn. For me, hyperthermia was something new that I had zero knowledge about. Through my project, I have learned so many things so far and I am sure that they are going to be many more in the future, since it is only the beginning. I am really looking forward to see how the whole project will develop and what the results will be.

Personally, I am curious to see how I will evolve and 'grow' as a scientist throughout this program and I am looking forward to the new challenges within and out of the project.



ESR14, Adela Ademaj

I am working under supervision of Prof. Dr. med. Oliver Riesterer in Radiation Oncology department at Cantonal Hospital Aarau and PhD student in Clinical Science program at University of Zürich, Switzerland.

My project focuses on derivation of clinical treatment parameters of hyperthermia when combined with radiotherapy, such as heating temperature, heating time, thermal dose, sequence and time interval between two treatment modalities, based on preclinical and clinical trial studies for different cancer sites. These treatment data will be used for modelling and evaluation of advanced hyperthermia treatment planning system which will be developed within Hyperboost consortium.

I strongly believe that being part of this network with multidisciplinary professionals and young researchers, I will gain knowledge, skills and expertise to pave together the way for personalized and effective multimodal cancer treatments.

A few months ago, I began working in my PhD project and living in Switzerland. Starting a new chapter during pandemic, it restricted my work to attend meetings, courses and conferences except via online platforms resulting in a lack of communication with different research teams. Therefore, I am looking forward in the next year to closely collaborating with clinical centers, universities, research institutes and companies with interest in hyperthermia as a clinical cancer treatment technique, to contribute in translating research into practice.

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

L.zuidmeer@amc.uva.nl

| Consortium Member | Short Name | Dept./Division/Laboratory |
|---|---|---|
| **Beneficiaries** | | |
| 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 | 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 |
| **Partner Organisations** | | |
| 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 |