



### Short reminder; 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. We train young researchers 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. Hyperthermia is already successfully used as cancer treatment combined with radiotherapy and chemotherapy, and we aim to further enhance its benefits by optimally exploiting the synergy between these two modalities.

### 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 finally received 252 applications. We have filled all positions just within the one-year margin (December 1<sup>st</sup>).

### Mid-term meeting of the Hyperboost Network!

January 28<sup>th</sup> 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 a year of

hard work for some and recruitment issues for others (..) we have now planned the mid-term meeting to be a face-to-face meeting in The Netherlands, January 18-19 2022. We have planned the first training week for the fellows adjacently, from January 20-25, and will plan a social event on January 23<sup>rd</sup>. Obviously, all will be dependent on the coronavirus situation in the different countries, but we sincerely hope it will be possible and preparations are in full swing.

### Introducing the Hyperboost fellows

In the first newsletter we already introduced some of the candidates (Azzaya, Sergio, Patricia, Mattia, Carolina, Rupali, Danai and Adela) and now we will continue with the others; Fernando, Priyanshu, Folefac Charlemagne, Timoteo, Spiros and Faezeh).

#### ESR1, Fernando Lobo

I am Fernando Lobo from Honduras, where I graduated as a Medical Doctor. I worked few months as a clinician and researcher before moving to Paris where I studied a Master's in Biomedical Engineering. During my master's, I worked as a research intern at the Hearing Institute, part of Institute Pasteur.

In December I started as a PhD at Amsterdam Universitair Medische Centra (UMC) in the Department of Medical Biology. We are currently studying how hyperthermia interacts with clinical cancer treatments, and in



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particular with radiotherapy using a multi-omics approach.

Starting again an academic life in new country is always as challenging and exciting. I have found in the Netherlands a very friendly environment for foreigners. The research team is composed by people from different backgrounds and nationalities, which makes it possible to carry out the work from a multidisciplinary perspective. By the end of 2021 COVID situation has again affected some countries, including the Netherlands. After one week of arriving, a new lockdown has been imposed for at least four weeks. This will undoubtedly make the adaptation to a new city more time consuming, but without a doubt this time can be used to grow academically.

Being able to work in a multidisciplinary team like Hyperboost I am sure will make me grow personally and professionally. It will also be very enriching to be able to travel and get to know the scientific perspective in different places where the project takes place.



## ESR2, Priyanshu Sinha



I was born in India but completed my high school in Dubai, UAE. I obtained my BSc in Biomedical Engineering at The University of Manchester, UK and followed further postgraduate endeavors with a MSc in Cell Biology from Germany, working with 3D colorectal cancer organoids as a model to mimic the immune-epithelial cell interaction. Now I am working in the Department of Oncology at the Aarhus University Hospital (AUH) and my project is focused on determining normal tissue response of irradiation in presence and absence of hyperthermia. My project is part of work package 3: with the aim to understand the synergetic effects of hyperthermia when combined with radiotherapy treatments in preclinical model. Apart from my work as a PhD student, I like to go on hiking trips specially during the winters and spring times, while I also follow and play sports such as Cricket and badminton. Additionally, I like to travel and see new places (if the pandemic allows) and try out exquisite cuisines.



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Due to the pandemic, the start of my project was initially delayed due to border closure and I had to patiently wait for things to normalize which was a great challenge. With the improving situation on my arrival to Denmark, I was able to start my project right-away with great support from my colleagues who greatly welcomed me to the department. It is a great honour for me to be a part of such diverse interdisciplinary project and work with talented researchers from multidisciplinary fields. Since all the fellows have the same mutual goal to improve the Hyperthermia treatment from different aspects, being part of such a consortium really fits my future ambition of establishing a career in translational precision oncology. I am really looking forward to work with the other ESRs within the consortium, especially those who are working with the preclinical evaluation and share my experience and findings while learning new things from them. The presence of international working groups working in different countries with different experience and approach to the mutual goals is something that I had always desired to be a part of, and I hope to make the most of the opportunity by engaging in collaborative work that would serve as a great platform for my future endeavours.

### ESR3, Folefac Charlemagne

After a BSc in Medical Laboratory Sciences from the University of Buea Cameroon, I went to Hasselt (Belgium) to study Biomedical Sciences (MSc) and an advanced MSc in Bioethics in Leuven. Before arriving in Belgium

in 2017, I have had 4 years of work experience as a Medical Laboratory Scientist and a research assistant in one of my home-based hospitals Mount Mary in Buea South West Region, and as a Quality Control Officer for Global Health Systems Solution- a nongovernmental organisation involved in strengthening medical laboratory facilities in Cameroon.



At the early stage of my master's degree, my research tract was focused on understanding the impact of diets (eg food ingredients) on various health and disease conditions. At the later stage, I focused more on understanding the biological mechanisms which occur during cancer development and also the various diagnostic, treatment and prevention methods. I did my master's thesis at one of the Belgian Nuclear Research Centre at SCK.CEN Mol which is involved in carrying out various studies on radiation and cancer biology. My thesis focused on investigating the



biodistribution and cytotoxicity of antibody-conjugated gold nanoparticles for cancer radiotherapy. I also received various trainings on cancer classification, hallmarks of cancer, radiation-induced non-cancer effects, just to name a few.

As PhD with hyperboost, I will be performing pre-clinical studies aiming to produce comprehensive data that will demonstrate not only the potential of combining hyperthermia with radiation, but also establish the parameters for the optimal benefit. My first project is to use tumors to determine the importance of the time interval between the application of radiation and heat (trying to determine the minimal heat temperature needed to enhance radiation response, and understand the role of thermotolerance and step-down heating). Moving forwards from here, the pathophysiological parameters that influence the heat-radiation interaction, and the mechanisms that are responsible for this will be assessed. Finally, the potential of hyperthermia added to reirradiation treatment would be further investigated.

To me, joining the hyperboost project is a great opportunity not just to become a future researcher in finding the solution to cancer but it has firstly given me the chance to relocate to Denmark to learn a new culture and secondly, to be working in a unique research department and institution—Department of Experimental Clinical Oncology, Aarhus University Hospital, Denmark under the direct supervision of some of the best researchers. In the years ahead, and through various hyperboost activities (seminars, trainings and meetings) I will also have various opportunities to meet other

researchers and other hyperboost fellows with various multidisciplinary educational backgrounds working on the hyperboost project in other research institutions.

Doing a PhD especially as a beginner may bring a lot of anxiety and is even be more difficult in the current times with the covid-19 pandemic and lock-down measures, which prevent us from spending physical moments with our families and loved ones as well as prohibiting some of our hobbies (to release some of the stress which come along with this new way of life). Where playing football and social outings have been some of my key hobbies of relaxation over the years and I have not been able to carry out these activities on regular basis since the covid-19 outbreak, I have gradually learned to adapt to new hobbies such as watching movies, having group calls with family members and friends on regular basis. I hope that in the days ahead things would gradually return to normal.

### ESR6, Timoteo Herrera



I am from Argentina, I obtained a BSc in Physics and a Master in Medical Physics from Instituto Balseiro, Bariloche, Argentina. After that, I trained as a medical physicist in



Radiotherapy in two clinics of Southern Argentina. I recently started working in the Radiotherapy Department of the Academic Medical Center Amsterdam, in The Netherlands, under supervision of Dr. Petra Kok and mentoring of Dr. Hans Crezee, as a PhD candidate of the University of Amsterdam and an ESR of the Hyperboost project.

My research focuses on developing optimization strategies for treatment planning of hyperthermia combined with radiotherapy. The main goal is to take advantage of the direct, synergistic and complementary actions of these two therapeutic modalities in order to improve the quality of treatments. For my work I will make use of mathematical models, preclinical and clinical data, coming from published work but also from the Hyperboost network.

It was definitely challenging to move almost 11,000 km away, amidst a worldwide pandemic, an economic crisis in Argentina and a housing crisis in The Netherlands. Even so, I could solve most of the practical issues with the help of my supervisors and the Project Management of Hyperboost, and since my arrival, everyone in the working group has given me a warm welcome. Although I will miss this summer in the Southern Hemisphere, I am looking forward to a holiday season of cold weather and hot chocolate.

I am looking forward to taking advantage of the collaborations that will arise within the Hyperboost network. With secondments to other institutions, meetings and training, it will give us the opportunity to not only improve our individual work, but to achieve a better joint result for the consortium.

I also value the interdisciplinary nature of the project, with hospitals, universities and companies involved, but also with different education backgrounds and work experience of the ESRs. I hope that I can meet everyone from Hyperboost soon, and that in the next few years I will be able to grow as a professional in research and in the clinic. I hope to make the most of Amsterdam, a city with people, food and cultural activities from all around the world. As well as introducing myself in the Dutch language and culture, I intend to hike and explore cities in Europe as much as I can.

Met hartelijke groeten,

Timoteo

**ESR7, Spyridon Karkavitsas**



I am from Crete (Greece) where I obtained my Bc in Physics. From my undergraduate years I was interested in applied physics and more specifically in the Medical Physics field. That is the reason why my undergraduate thesis was focused on the effect of quality control on the function of Magnetic Resonance Imaging (MRI).



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Expect of that I worked for three months as an internship student at the department of Nuclear Medicine of University Hospital of Ioannina (UOI, Greece).

After my Bachelor, I started my Master's studies at the Kapodistrian University of Athens (UOA, Greece). During my second year I performed my Master's thesis which was focused on the utility of MRI in the accurate monitoring of temperature on mild hyperthermia scales. So, that year was an opportunity for me to be introduced in the fascinating field of hyperthermia.

Three months ago I moved to Munich to participate as a PhD candidate in the Hyperboost project in the company Dr. Sennewald Medizintechnik GmbH and the Hyperthermia Unit of LMU Klinikum. My project is mainly focused on technology for improving MR guided mild RF hyperthermia. The starting point of my PhD is the study of the clinical effectiveness of the already established Magnetic Resonance Thermometry (MRT) Double Echo Gradient Echo. So currently I am analysing already existing clinical data of patients so that I can quantify the precision of this MRT technique in the pelvic region. Based on the results, I will proceed for further improvements. In addition, an extremely difficult and simultaneously interesting task of my PhD is the development of imaging methods for reconstructing 3D temperature distribution from noisy MR data. So, in the future I will study the feasibility of quantitative T2 mapping as a means to monitor accurately temperature in difficult regions such as the pelvic regions as well as easy regions like the lower extremities.

Working abroad is a new and challenging experience for me. However, I love working hard for a common scientific goal and facing upfront new challenges in my life. Fortunately, I enjoyed the first months in Munich as much as I could because the Covid situation till now was not so severe. Also, the transition to a new and completely different country from Greece was smooth because my girlfriend also moved to Germany for her PhD studies.

Through my participation in this programme, I expect to sharpen my programming and computational skills and develop even more my theoretical and practical knowledge in MRI. In addition, I hope to successfully finish my PhD studies and continue working abroad in the industry or academic sector. Also, I cannot wait to meet in person all of the ESRs, travel a lot and have unique experiences.

#### ESR12, Faezeh Rahimi

I am Faezeh from Iran, the land of art, knowledge, and of course saffron. I was born in an educated family with strong social values of hard work and resilience in the face of adversity. I studied my MSc in telecommunications -fields and waves-engineering at the K. N. Toosi university of technology, Tehran, Iran, and I worked on a Hyperthermia RF applicator design and fabrication.

I joined to BUFF group at MDC Berlin. My project aims to unlock the potential of ThermalMR for targeting human tissue through radiofrequency (RF) induced manipulation of temperature. This involves the development of new RF technology including hybrid RF applicator arrays but also



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the development of solutions to the electric field focusing problem. The latter approach would not only significantly benefit the treatment planning and efficacy of targeted RF heating-induced hyperthermia but would also enhance the design and evaluation process of RF applicators. Different RF applicator designs could be readily compared, and their relative performance accurately benchmarked without the added uncertainty of a non-optimal solution.



Regarding the crucial situation caused by the pandemic in Iran, continuing to work in this situation in Berlin was not a big shock to me. Fortunately, everybody is adapted to the new situation, and enjoying life as well as taking care of ourselves is becoming the priority in Berlin.

I hope that breathing in this atmosphere helps me to improve my scientific and engineering knowledge and skills by considering the clinical limitations, by participating in beneficial workshops, connecting to reputable scientists, and presenting my progress to obtain feedback to stay on the correct path. Being a part of the HYPERBOOST could comfort my mind in the way of having enough support from my supervisor, the project manager, and other group leaders in order to accomplish a valid PhD research which is relaxing to make me more enthusiastic to continue my career as a scientist or researcher. Furthermore, working in such a diverse multicultural project in the HYPERBOOST with 12 other fellows from all over the world is an amazing opportunity to improve my teamwork and networking skills.

I am extremely looking forward to meet the other fellows, participate in training workshops and relevant conferences and define my research path on the way of success.



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**All the best wishes for a Happy and Healthy  
2022 from the Hyperboost Network!**



**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	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
<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
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