



## Boron Neutron Capture Therapy- seminar CNA, Uni. Seville, Spain, 2022-01-13.

**On Thursday 2022-01-13 at 12:00 there will be a live webinar organized by Centro Nacional de Aceleradores, Universidad de Sevilla on Boron Neutron Capture Therapy.**

There will be two presentations of 20 min plus 5 min for discussion. There will be online access via BlackBoard platform at <https://eu.bbcollab.com/guest/4363410a8dd343d0859eec6c98fa7de1> with possibility to ask questions by chat.

*Prof. Wolfgang Sauerwein*, Okayama University, Japan and German Society for BNCT, Essen, Germany:

**Boron Neutron Capture Therapy on the Threshold of Clinical Routine:** After 40 years of research, a view of a business model

*Abstract:* Boron neutron capture therapy (BNCT) has been a multidisciplinary, challenging university research topic since the 1950s. However, as a therapeutic modality, it has never arrived in the reality of medicine despite multiple, interesting clinical trial approaches. A major reason for this is that a powerful research reactor was needed as a neutron source. Such facilities were generally far away from hospitals, so that clinical studies with enough patients to produce statistically reliable results could not be realized. Recently, a paradigm shift has begun. High-intensity epithermal neutron sources are now commercially available, and three hospitals in Japan are currently treating patients with them. However, for a new treatment modality to be accepted and reimbursed by health care systems, it is necessary to demonstrate that this new treatment is either equivalent and less expensive than existing treatment options or superior to them. The difficulty of such proof can be demonstrated by the example of proton therapy, which is offered in many centers worldwide, but for which there is no evidence that any of the above-mentioned conditions are met. Consequently, reimbursement is controversial in most health care systems and only possible for a few indications under special agreements. To prevent BNCT from reaching such an impasse, a business model has been developed, the principles of which are briefly summarized here: Basically, clinical trials with a sufficient number of patients have to be performed in a short time to generate evidence, which is a prerequisite for reimbursement. To achieve this, the BNCT Global GmbH was founded. Under one management 10 BNCT centers with the same technical equipment are built and operated worldwide. The joint clinical studies follow a uniform study protocol so that the results can be evaluated jointly. This makes it possible to obtain the necessary data within a manageable period. We are currently negotiating with interested hospitals that want to participate in this concept as local partners.

*Prof. Marek Maryński*, Gdansk University of Technology, Poland:

**Towards mapping 3D distributions of dose and LET in gel phantoms for beam characterisation and QA in BNCT.**

*Abstract:* Beam dosimetry and QA in BNCT requires accounting for contributions from components of widely different LETs (e.g., gammas, alphas, protons, neutrons) that change both with depth and laterally, and as a function of local B-10 concentration. Transmission laser CT of polymer gel dosimeters has been proven very useful in high-definition 3D dosimetry in both photon and proton therapy. In addition, an LET-specific signature has been found based on Mie scattering of light on nanoclusters of radiation-induced polymers in certain gel formulations exposed to proton therapy beams and patient-specific treatment plans. It appears therefore possible, at least conceptually, to develop a methodology for high-definition 3D mapping of both physical dose and LET in gel phantoms for BNCT beam characterization and regular QA. 3D mapping of "biological dose" (however defined and modelled) would then be within reach, thus potentially increasing the clinical effectiveness of treatment planning and delivery in BNCT. This advantage might also be applicable to other high-LET radiotherapy modalities such as C-ions. This is the direction of our research project, funded in part by the Polish Government's National

## **Biographies of the speakers.**

**Prof. Dr. med. Wolfgang Sauerwein** studied medicine in Limoges (France) and Essen (Germany). He is a board-certified radiologist and radiation oncologist. He is retired professor at the University Duisburg-Essen, visiting professor at Okayama University and president of the German Society for BNCT. In 2021, he initiated the foundation of the company "BNCT Global GmbH", which aims to establish and operate 10 BNCT therapy centers worldwide within the next 5 years to make BNCT a treatment method reimbursed by national healthcare systems. One of his main research activities is the use of particles in cancer therapy: protons, neutrons, carbon ions, and BNCT. Other foci of his scientific interests are the treatment of eye tumors, radiation protection in radiation therapy, and the Monte Carlo simulation of medical linacs with the resulting dose distributions in patients. A core area of his clinical work was international collaboration to treat patients with particles at large and expensive facilities around the world. Recently he was awarded the "The Order of the Rising Sun, Gold Rays with Neck Ribbon" (旭日中綬章) of the Japanese Imperial House.

**Prof. Marek\_Maryański, Ph.D.** *Currently:* Professor of Gdańsk University of Technology. Director, Division of Multidimensional Radiation Detectors, Faculty of Applied Physics and Mathematics, Gdańsk, Poland. Main field of research: Radiation Biophysics, Inventor of polymer gel dosimetry of ionizing radiation. He holds PhD in Physics from Gdańsk University of Technology. Formerly employed in Gdańsk University of Medicine, Poland; Yale University, School of Medicine, Depts of Diagnostic and Therapeutic Radiology; Columbia University, New York, NY, USA, Radiation Oncology Dept. Founder, President, Director of Research & Development, Chairman of the Board of MGS Research, Inc. DBA 3D DOSIMETRY, Madison, CT, USA.

**For any questions, please contact Marcin Balcerzyk, including a link for the seminar recording:**  
[mbalcerzyk@us.es](mailto:mbalcerzyk@us.es).