

In memoriam: Peter Wust, MD, PhD

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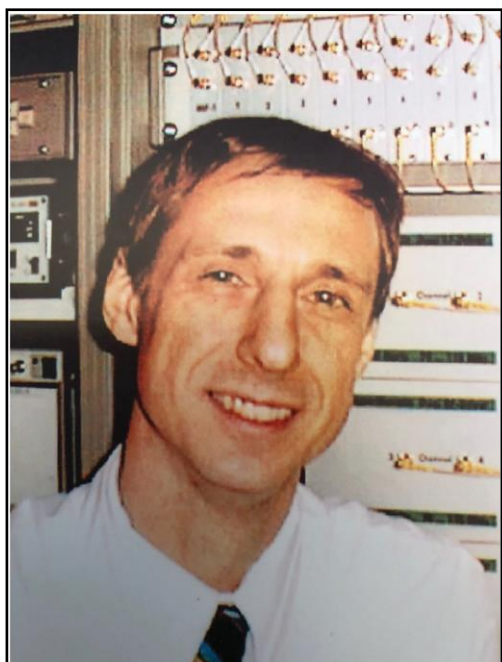
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Cite this article as:

Mark W. Dewhirst (2022) In memoriam: Peter Wust, MD, PhD, International Journal of Hyperthermia, 39:1, 1170-1171.
<https://doi.org/10.1080/02656736.2022.2115872>

Oncothermia Journal 32, September 2022: 155 – 157.
www.oncotherm.com/sites/oncotherm/files/2022-09/Dewhirst_In_memoriam_Peter_Wust.pdf



Professor Peter Wust, MD, PhD
July 9, 2022

It is with great sadness and regret that we announce the death of Professor Peter Wust, on 9 July 2022. Dr. Wust was a translational scientist with rare dual training in both Medicine and Biophysics. This training, combined with his clinical training in radiation oncology set him apart from the majority of scientists engaged in hyperthermia research. This training allowed him to establish himself as a thought leader from the very beginning of his engagement in the field.

Dr. Wust published his first paper in the field entitled 'Numerical Approaches to treatment planning in deep RFhyperthermia', in 1989. From the very start of his career in the field, he showed the how blending of physics /engineering with medicine could lead to better equipment performance in the clinic. In this early work, his emphasis on modulating power deposition using phase and amplitude steering set the stage for later major efforts on this subject that continue to today. His critical view of the importance of equipment performance led to quality assurance standards and several important tools for ensuring proper applicator performance. He was among the first scientists to implement MR thermometry into clinical practice.

Dr. Wust looked beyond traditional microwave /RF/and ultrasound for implementation of hyperthermia. Dr. Wust collaborated with Dr. Jordan in the development of clinically viable systems for using inductive heating of ferromagnetic particles as a means to heat tumors. This collaboration led to the conduct of clinical trials for treatment of primary brain tumors and prostate cancer. He conducted some of the first studies using laser induced hyperthermia for treatment of head and neck cancer as well as exploring use of fever range total body hyperthermia in conjunction with radiotherapy for head and neck cancer.

Overall, he conducted clinical trials involving hyperthermia with radiotherapy and/or chemotherapy for several disease sites, including brain tumors, prostate cancer, rectal cancer, cervix cancer, soft tissue sarcomas and head and neck cancer.

In the past 10 years, Professor Wust continued his broadbased view of the field by publishing detailed scholarly reviews on important topics, such as 'Non-thermal effects of radiofrequency electromagnetic fields', published in Scientific Reports in 2020, and 'Neoadjuvant chemotherapy plus radiation versus chemotherapy plus regional hyperthermia in high-grade soft tissue sarcomas: a retrospective comparison' published in the International Journal of Hyperthermia, in 2018.

Dr. Wust published a total of 364 papers in his career, receiving a total of nearly 17,000 citations and an H-index of 59. The most highly cited paper of his career was the 2002 review in Lancet Oncology, entitled 'Hyperthermia in combined treatment of cancer'. This paper was given the 'Hot Topic' designation by Web of Science and has been cited nearly 1400 times. This paper has stood the test of time and is still being quoted today.

In recognition of his scientific contributions to the field, Dr. Wust received many accolades, including receipt of the ESHO-Award at the International Congress of Hyperthermic Oncology in 2000 and served as the Organizing chair for the 16th Annual Meeting of ESHO in Berlin in 2006. He was the Head of the MR/hyperthermia hybrid unit at Charité Universitätsmedizin Berlin from 2001 to 2010. He was widely recognized for his critical views within the field, serving on the Editorial Board of the International Journal of Hyperthermia until the time of his death.

For more than 40 years his wife Carla was at his side. In his humorous and generous way, his helpful and tolerant nature made him a great person and beloved colleague. For many of us he was an important teacher, mentor and friend.

He was a perfect middle between natural sciences and medicine and therefore a definite role model for the future. His open mind and the effortless bow across subject boundaries are recognized by many as key to modern medicine. Dr. Wust's leadership in the field will be sorely missed, but as can be seen by evaluation of his scientific career, his impact will be felt for decades to come.

Five most highly cited publications

Wust et al. Hyperthermia in combined treatment of cancer. *Lancet Oncology* 2002, 1363 citations. DOI:10.1016/S1470-2045(02)00818-5

Jordan et al. Magnetic fluid hyperthermia (MFH): cancer treatment with AC magnetic field induced excitation of biocompatible superparamagnetic nanoparticles. *Journal of Magnetism and Magnetic Materials*, 1999, 1178 citations. DOI:10.1016/S0304-8853(99)00088-8

Hildebrandt et al. The cellular and molecular basis of hyperthermia. *Critical Reviews in Oncology Hematology* 2002, 1173 citations. DOI:10.1016/S1040-8428(01)00179-2

Maier-Hauff et al. Efficacy and safety of intratumoral thermotherapy using magnetic iron-oxide nanoparticles combined with external beam radiotherapy on patients with recurrent glioblastoma multiforme. *Journal of Neuro-Oncology* 2011, 826 citations. DOI:10.1007/s11060-010-0389-0

Jordan et al. Presentation of a new magnetic field therapy system for the treatment of human solid tumors with magnetic fluid hyperthermia. *Journal of Magnetism and Magnetic Materials* 2001, 563 citations. DOI:10.1016/S0304-8853(00)01239-7