

have a number of problems, to organize staff training, and so on....

I will continue to promote MW and RF technologies during the next few years. There is still much to be done.

About the author

J P Bernard completed his degree in Electrical Engineering at the University of Lyon in 1976 -1977 and joined Prof Jean Pierre Pelissier' s group working towards his doctorate. SAIREM was created in 1978 and Jean Paul joined the company as a shareholder, became Managing Director in 1982 and stayed until 2018. He then established his new consultancy MIS while at the same time remaining with SAIREM for 5 years to assist in the transition.



Why Microwave Technologies Consulting?

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My educational background includes an MSc in Technological Organic Chemistry and a PhD in Radiochemistry & Nuclear Materials from the Polytechnic University of Bucharest. It was during my PhD that I discovered microwaves, their applications and the AMPERE organisation.

My PhD thesis, although directed by the Polytechnic University of Bucharest, involved a very challenging hands-on project of exhaust gas treatment by accelerated electron beams at the Institute of Atomic Physics (IAP) in Bucharest for which I was working as a newly appointed research scientist. One may think there is a long way between the ionizing radiation produced by a 10 MeV linear electron beam accelerator (LINAC) and the non-ionizing radiation coming from a simple 'kitchen' magnetron yet, I shortly discovered that our LINAC was accelerating the produced electrons through a number of monomode resonant cavities operated at 3 GHz. The idea of building a hybrid chamber that made possible to treat the exhaust gas by a combination between the LINAC's accelerated electron beams and the microwaves emitted by a 2.45 GHz magnetron was the novelty of my thesis [1] and was made possible

by Dr. Diana Martin with whom I collaborated at the IAP and who made me resonate at 2.45 GHz. Diana trusted my chemistry skills and we were microwaving everything – from waste wine distillation to polymers for wastewater treatment, to hybrid electron beam-microwave plasmas for exhaust gas treatment and so many other applications 'just for curiosity'. Needless to say that my first equipment was a kitchen oven 'adapted' by Dr. Martin – it had shielded chimneys to introduce glassware and it had a tabletop variac for adjusting the microwave power! This was the equipment that sent me to my first AMPERE conference in Fermo, Italy where I presented work related to microwave assisted catalysis en liquid phase. The paper earned me a student award and the great privilege of meeting Dr. Milan Hajek who invited me to join his catalysis group at the end of my PhD. A year after, a second PhD at Kingston University, Ontario, Canada within the group of Prof. J. Wang gave me the possibility to work in a microwave-assisted plasmas research project funded by an industrial group, which gave me the microwave plasma expertise and the invitation to join the R&D team

of BOC Edwards U.K. at the beginning of 2001 and Sairem, France at the end of 2008.

I created Microwave Technologies Consulting (MTC) [2], in February 2018. I had just graduated from Ecole de Management Lyon (EM Lyon) where I fast-tracked an Executive MBA that waved me towards entrepreneurship. Having dedicated over 25 years to microwave applications, the foundation of a consultancy devoted to microwave applications for the industry and for the young came to me as a must do. Despite my involvement with the industry, I always tried to find recipes for being involved with academics, trying to pass my knowledge on to young Master or PhD students.

Teamed with Mr. Ariel Mello, Technical Director of MTC, we collaborate with academia and businesses of all shapes and sizes globally. In our microwave laboratory hosted by Axel'One (www.axel-one.com), Lyon, France, Ariel and I are convinced that our role is to connect science and business, innovation and commercialization to educate young generations as to bring bright ideas and research into the marketplace.

We dedicate our time to understanding and optimising microwave-assisted processes to enable timely process development in line with project demands, from basic R&I approach through to development and life-cycle management.

Finally, I am very proud that my microwave related work has been acknowledged several times, by both the launch of microwave-assisted processes/equipment for the industry and by awards, including two very special to me, from my peers AMPERE fellows:

- Rustum Roy Award, 3rd Global Congress on Microwave Energy Applications, Cartagena, Spain, 28th July 2016;
- AMPERE 2019 Medal, Valencia, Spain, 12th September 2019;
- Trophées des Femmes de l'Industrie, Femme de R&D / R&D Woman award, Paris, France, 24th September 2019;
- Rennes Innovation Award 2011 for Equipment & Technology;

- Chartered Chemist and Chartered Scientist of the Royal Society of Chemistry since 2005.



R&D Woman award, Paris, France, September 2019



Hands on with Master students, December 2021

Least but not last, I am proud that microwave heating and microwave plasmas are technologies that are starting to be acknowledged by the world and by the EU as industrial solutions to a greener industry by their role in process electrification. *'...Integrate existing highly efficient technologies, e.g., induction heating, hybrid operation between electric heating and zero-carbon fuel heating **microwave and plasma technologies**, electric resistances, and/or the combination with digital technologies or hybrid modelling...'* [3].

For further reading

1. M. Radoiu, D. Martin, I. Georgescu, I. Calinescu, V. Bestea, I. Indreias, C. Matei, "A laboratory test unit for exhausted gas cleaning by electron beam and combined electron beam - microwave irradiation", Nucl. Instrum. Physics Research, B, 139, p.506-10, 1998, 10.1016/S0168-583X(97)00977-4.
2. www.microwavetechnics.com
3. <https://ec.europa.eu/info/funding-tenders/opportunities/portal/screen/opportunities/topic-details/horizon-cl4-2023-twin-transition-01-33>

Ricky's Afterthought:**UK's Prime Minister aims to turn the UK into a Science and Technology Superpower****A.C. (Ricky) Metaxas**

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In Issue 112 I reported on the demise of the European Horizon funding scheme for UK based-researchers. They were excluded and those that were awarded grants were told that they had to move back to Europe in order to continue benefiting from the scheme. It is not clear whether, now that great strides have been made by the Prime Minister (PM) Rishi Sunak on the Northern Ireland Protocol, Europe may reverse its decision and allow the original funding to continue.

However, the newly formed Science, Innovation and Technology Department, headed by 38 year old Michelle Donelan and strongly backed by the PM, announced major funding evidently to boost UK based researchers to compete globally with other countries, notably USA, China and the European Union. How does this new funding stand with the Industrial Strategy Challenge Fund launched some 7 years ago by the then PM, Theresa May, which promised to support businesses to the tune of £700 million working on cutting edge technologies such as AI and robotics is not at all clear. The Strategy Fund is managed by the Engineering and Physical Sciences Research

Council (EPSRC). By now some of the initial projects must have come to fruition and it would be interesting to read the consensus of the scientific community as to the success rate.

Never the less the Press Release from 10 Downing Street on Monday 6 March 2023 read as follows:

The Prime Minister and Technology Secretary today launched the government's plan to cement the UK's place as a science and technology superpower by 2030.

Bold plan to grow the UK Economy, create high-paid jobs of the future, protect our security and radically improve peoples lives through science, innovation and technology outlines.

The plan will bring every part of government together to meet one single goal: to cement UK's place as a global science and technology superpower by 2030. Backed by over £370m in new government funding to boost infrastructure, investment and skills for the UK's most exciting growth technologies from quantum and supercomputing to AI.

The new Science and Technology Framework is the first major piece of work from the