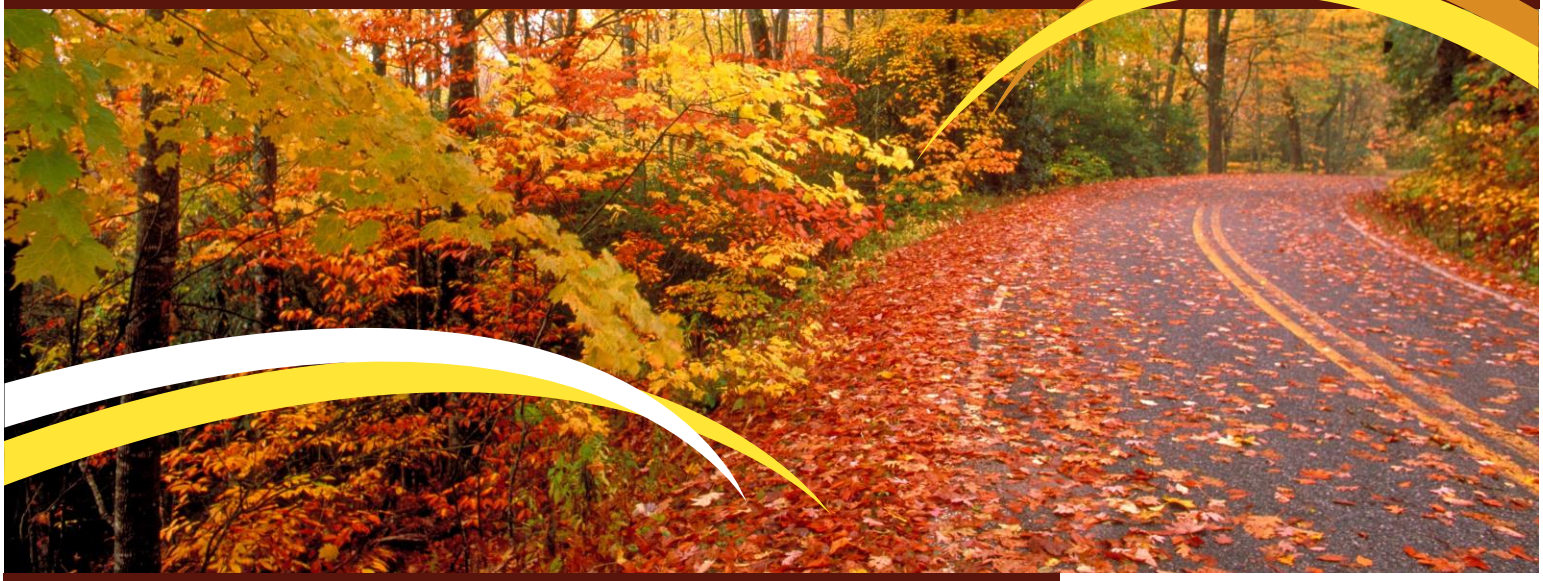
THE WAVE

The newsletter publication of the International Microwave Power Institute

September/October 2013



Meet the Fellow: Dr. Geoffrey Voss

Introduction by Bob Schiffmann: I am delighted to welcome Dr. Geoffrey Voss back into the IMPI fold. Dr. Voss is one of the pioneers in the areas of microwave science, technology, engineering and applications. His long history with IMPI includes distinguished service as the first Editor of the Journal of Microwave Power and as IMPI's first Fellow. I was Secretary to the Board when we wished to honor Geoffrey by making him a Fellow of the Institute, and that required setting up the rules for this Honorary award, which we follow to this day. Welcome back Geoffrey!

The first microwave power symposium was held at the University of Alberta in March 1966. IMPI was formed immediately afterwards through generous support from American industry. The audience of about 100 people came from many areas of industry and academia. The idea that IMPI might promote a solution and go looking for problems was dispelled by the Charter. IMPI's Letter Patent required the society and its publications to cross disciplines and to cross generations. Looking back over 47 years I believe that it has done that through holding meetings across the world and through JMPEE.

The flagship for large microwave power systems was in the 1960's and probably still is the microwave powered helicopter. It was the first technical presentation at the 1966 Symposium given by W.C. [Bill] Brown of Raytheon. He was also the author of the first paper published by JMPEE [then JMP]. The technology and its spin-offs caught people's imagination; it intrigued potential users, equipment manufacturers and [most important] researchers in many areas: so many processes might be improved with microwave energy. Some said, quietly and correctly, that we really meant electromagnetic energy – different frequencies and systems for different applications. *Continued on next page…*

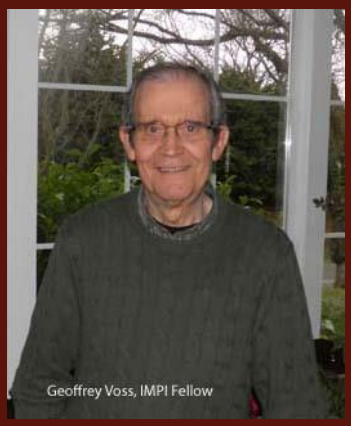
Letter from the President

by Bob Schiffmann

Here it is September already and the summer is winding down to a close. With all the Fall colors, it is a beautiful time to be on the trout stream. Also, September brings two important microwave events:

1. IMPI Fall Short Course, "Microwave Trends", October 9" and 10 on the ConAgra campus in Omaha Nebraska. The program is devoted to assisting microwavable product developers, and will address the issues of what's happening in the consumer market; the impact of the new food safety regulations; new ingredient technologies; package design and technology; product testing and validation. (***Continued on page 2)***

Voss Continued



Ideas initially came to some potential users from simple experiments in microwave ovens. Not a good start in many cases; the importance of defined studies using industrial equipment became clear. Three papers from industry in 1966/67 gave promise, perspective and warnings: veneer re-drying, multi-magnetron conveyor chicken cooking and, most important, costs from economic modelling.

The high-speed microwave threadline dryer is one good example of early industrial development. Using a basic mode-controlled cavity with feedback, Dupont's Hank Huang demonstrated the successful solution to one industrial problem. Many were to follow. But it should be remembered that some conventional heating and drying processes were improved by no more than the thought of a new technology. Evaluations of electromagnetic energy are always complex and continue to challenge many R&D groups across the animal, vegetable and mineral world.

Early IMPI meetings and discussion groups in different cities were attended by people from all walks of life. This point was emphasised and encouraged by IMPI's 1967 President, John Gerling, writing in JMP. One example a few years later I remember quite clearly. The vicar of an English church had read in the press of Stu Nelson's extensive work on insect control by electromagnetic energy. The vicar's concern was death watch beetle in the beams of his church.

Continued on next page…

Letter from the President cont.

There's an exciting lineup of speakers. Details and registration information can be found elsewhere in this newsletter. It promises to be a very exciting program.

2. AMPERE 2013: the conference to be held at the University of Nottingham (UK) September 17-19, will have over 100 presentations, in sessions of interest to our IMPI Members. Conference Chairman Professor Sam Kingman and Technical Program Chairman Dr. G.A. Dimitrakis both of the University are both to be congratulated for their fine work. Over a half dozen IMPI members will be presenting papers.

In a recent New York Times editorial, "Welcome to the Age of Denial", Adam Frank, a professor of Physics and Astronomy at the University of Rochester, he writes that "…instead of sending my students into a world that celebrates the latest science has to offer, I am delivering them into a society ambivalent, even skeptical, about the fruits of science. … Today … it is politically effective, and socially acceptable, to deny scientific fact. … And all of this is happening in a culture that is less engaged with science and technology as intellectual pursuits than at any point I can remember."

So, here we are, scientists and technologists engaged in microwave pursuits, organizing and attending conferences as those above, with distinguished publications, such as the Journal of Microwave Power and Electromagnetic Energy, and it appears that we are not doing a good job of telling the general public about the realities of microwave energy and its use. I continue to see wild statements in the press and on the Web that misinform and frighten the public about the non-existent dangers of microwaves: that cause cancer, autism, and nearly every ailment you choose to list. Folks, we are not doing a good job of telling the public the good things about microwave energy and helping them avoid the hysteria caused by misinformation: the denial of scientific fact. We need your help to improve how we get correct information before the public. I welcome your suggestions.

With best wishes for a beautiful season,

Bob

IMPI 48 Call for Papers to be Released this Month

The 48th Annual Microwave Power Symposium will be held June 18-20, 2014 at the Doubletree Hotel in New Orleans, Louisiana, USA.

The Call for Papers will be available on the IMPI website by September 20. Check www.impi.org in for more info.

The Technical Program Chairman for IMPI 48 is Professor Ray Boxman from Tel Aviv University. IMPI President Bob Schiffmann will Chair at the Food Track Committee. IMPI 48 will take place just before the annual IFT in New Orleans.

Voss Continued

He had with him a smelly sample of rotten oak, dead larvae included, in a plastic bag. What did we think? A heart surgeon known for his work on the microwave warming of tissue, a vicar and the manager of a potato chip plant all in earnest conversation at the bar …with a microwave engineer listening carefully – it could only happen after an IMPI meeting!

The kitchen revolution created by the domestic microwave oven, followed by the growing acceptance of institutional as well as food commercial systems, is in large part due to the careful scientific explanations of the safety issues. Many members of IMPI in their various roles and through numerous committees deserve great credit in this area. Two names, for me, stand out over the last forty years: Bob Schiffmann and John Osepchuk. They were there 47 years ago and both are still very active. IMPI owes its success to them and very many others who have worked hard for this Institute over the years.

At the end of the 80's I wandered into other disciplines. The physical properties of materials and forensic analysis then drew me into the world of art and antiques. IMPI started me on a splendid journey across disciplines. For the experience and the honour of serving IMPI in the past I am very grateful.

W. A. Geoffrey Voss PhD CEng MEIT
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Victoria B.C. September 2013

Fall Short Course 2013

IMPI's Fall Short Course on "Microwave Trends" will take place October 9-10, 2013 on the ConAgra Campus in Omaha, Nebraska, USA.

Early bird registration has been extended until September 17th, but the course is filling up quickly.

Confirmed speakers include:

- David Acheson, MD, Managing Director, Food & Import Safety, Leavitt Partners; former Chief Medical Officer and Associate Commissioner for Foods, FDA;
- Lynn Dornblaser, Director, Innovation & Insight, Mintel Group;
- Bob Schiffmann, President, R.F. Schiffmann Associates Inc.;
- Tracy M. Mosteller, Ph.D., Senior Application Specialist, DuPont Nutrition & Health;
- Tim Bohrer, President, Pac Advantage Consulting;
- Jon Wolfe, Senior Sales and Appliance Specialist, Inline Packaging LLC,
- Darren Hecht, Business Development Manager, Mitsubishi Corporation;
- Steve Vlock, Quality Manager, ConAgra Foods; and
- Judy Lindsey, Vice President and General Manager, Product Dynamics, a division of RQA Inc

There will also be a Microwave 101 Pre-Short Course on October 8.

Additional details on the speakers, registration and hotel accommodations can be found here. Contact Molly.poisant@impi.org for more details.

Calendar of Events

AMPERE: The 14th International Conference on Microwave and High Frequency Heating organized by The University of Nottingham and The Association for Microwave Power in Europe for Research and Education (AMPERE) is taking place in Nottingham, UK on 16-19th September 2013. The conference is the premier Microwave processing forum in Europe and focuses on novel applications of MW and RF heating in Industry and Academia. For more information please visit the conference website www.ampere2013.com

IMPI's Fall Short Course on Microwave Trends, October 9-10, 2013, ConAgra Campus, Omaha, Nebraska, USA. www.impi.org

48th Annual Microwave Power Symposium (IMPI 48), June 18-20, 2014 at the Doubletree Hotel, Downtown New Orleans, Louisiana, USA. www.impi.org

Ask the Expert

Question: There are several non-food products, such as heating pads, wax depilatories and grain-filled teddy bears, being sold for heating in microwave ovens. Are they okay, or problematical?

Answer: Microwave ovens were developed exclusively for the heating of foods. What makes foods especially compatible with microwave ovens is that most foods contain considerable amount of water, and water has a very useful dielectric profile, namely that its dielectric loss factor (ε") decreases with temperature. So, as foods get hotter, the rate of heating slows down; in a sense the heating of foods is somewhat self-controlling. Two other advantages are the high heat capacity of water, and its boiling point of 100° C: as long as there's water present in the food, the temperature cannot climb above that.

By contrast, many non-food products contain very limited amounts, or no water. For example, the basic composition wax depilatories for the removal of body hair, is based upon a wax (no water), such as carnauba, that needs to be melted for application Waxes are low dielectric loss materials at room temperature, heating very poorly in a microwave oven, until they melt, at which point their loss factors increase dramatically and they heat very fast, partly due to their low specific heat capacities (on the order of half that of water). Also, wax temperatures can rise far above 100° C. In my laboratory, we found that when microwaving, the temperature of such a wax will remain at room temperature for several minutes until there is some melting, at which point the melted area heats very quickly to a dangerously hot temperature.

The teddy bears are filled with a grain, such as wheat, and are to be heated in microwave ovens to provide fragranced bed-warmers. However, they can be extremely dangerous since they tend to heat internally, resulting in a pleasantly warm surface, while the interior becomes hot enough to ignite. These products are known to have caused the number of serious fires. Gel heating pads also tend to heat internally, resulting in comfortable initial surface temperatures that may rise dramatically within 30 to 60 seconds as the high heat transfers from the interior, resulting in injuries such as third-degree burns.

The bottom line is, never heat anything other than food in a microwave oven!

Bob Schiffmann

Do you have a question you would like to submit to Ask the Expert? Email molly.poisant@impi.org

INTERACTIVE IMPI *Direct links to Microwave News on the Web*

Report on "Global Microwave Packaging Industry"

The European Commission on Electrotechnical Standardization announces that EN 60335-2-90 which deals with safety of microwave ovens intended for commercial use, and is being updated

Spanish researchers use microwaves to control the brown rot of stone fruit.

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