

THE WAVE



The newsletter publication of the International Microwave Power Institute

April/May 2016



IMPI GEARS UP FOR MILESTONE SYMPOSIUM

We are just 9 weeks away from the 50th Annual Microwave Power Symposium (IMPI 50), to be held June 21-23, 2016 at the Caribe Royale All-Suite Hotel and Convention Center in Orlando, Florida, USA.

There are over 50 presenters covering a range of topics over the 3-day event, which will include keynote addresses, invited papers, oral and poster presentations and panel discussions. A full [Schedule of Events](#) is available for download.

In celebration of our 50th Symposium, we have invited the heads of the international microwave organizations (representing China, Japan, Europe and the UK) to join us as well as Fellows of the Institute. We have outstanding early registration numbers. The [current Attendee List](#) is available for download.

Muegge GmbH will serve as the Gold Sponsor. Richardson Electronics and Ampleon have come on board as Silver Sponsors and Ferrite Microwave Technologies as a Bronze Sponsor of the event. We also have a record number of Exhibitors participating – 10 at this time! There are a limited number of [Sponsorship](#) and [Exhibition](#) opportunities available for purchase.

Early bird registration has been extended until May 5th and IMPI Members save \$100 via their membership, so sign up today. There are hotel rooms available at the \$149 group rate at the Caribe Royale and you can [book your room online](#).

We can't wait to celebrate with you in Orlando this June!

PRESIDENT'S MESSAGE

I grew up during World War II, at a time when there was no television, obviously no computers, and no freezers, hence no frozen food industry. As an undergraduate, little or nothing was known in the fields of biology chemistry and physics about such things as the structure of DNA, cosmology, nanotechnology, etc. While doing my graduate work at Purdue an entire building was devoted to the University's mainframe computer; the engineering students walked around with slide rules in leather scabbards since we didn't even have calculators much less desktop computers. As to that mainframe, our desktops, and maybe even our smart phones have as much computing power.

So here I am today, constantly astonished on a daily basis at the advances in science and technology.

Continued on Page 3

Campbell Soup Company to Sponsor Fall Short Course in Philadelphia, PA

Save the date for IMPI's Fall 2016 Short Course, which will be held October 25-27, 2016 at the Penn View Hotel in downtown Philadelphia, PA. Hosted by IMPI and sponsored by Campbell Soup Company, this 2-day event will feature an optional Microwave 101 Pre-Short Course the afternoon of October 25th, followed by a Welcome Reception that evening and 2 full days of content on the 26th and 27th. We are in the process of building the program; if you have a topic or speaker to recommend, please email molly.poisant@impi.org

More details will be added to <http://impi.org/symposium-short-courses/> in the near future.

JMPEE - 50th ANNIVERSARY – First Issue Published by Taylor and Francis

Volume 50, Issue 1 was published the end of March 2016. Taylor and Francis is currently finalizing the log in details for our IMPI members and you will receive directions on how to access the Journal by the end of the month. We appreciate your patience during this transition.

The following papers appear in Volume 50, Issue 1:

Effects of Receiver Parameters on the Wireless Power Transfer System via Magnetic Resonance Coupling

Xinzhi Shi, Chang Qi, Meiling Qu, Shuangli Ye

A Novel Approach for Generation of Power by Harvesting Microwave from the Ambient Environment

B. Paulchami, J. Jaya, A. Ventakesh

Pasteurization Treatments for Tomato Puree using Conventional or Microwave Processes

Gabriela Pérez-Tejeda, Fidel T. Vergara-Balderas, Aurelio López-Malo, Roberto Rojas-Laguna, Ma. del Rosario Abraham-Juárez, María Elena Sosa-Morales

Continuous tubular microwave heating of homogeneous foods: evaluation of heating uniformity

Birgitta Wäppling Raaholt, Sven Isaksson, Lars Hamberg, Andreas Fhager, Yngve Hammerius

A Novel Dual Calibration Technique for Microwave Early Breast Tumor detection in MR Images Based Model

Liang Wang, Xia Xiao, Hang Song and Qinwei Li

SPRING WEBINAR SERIES CONCLUDES

IMPI's 3-Part Spring Webinar Series on Food Safety was a huge success with over 100 attendees participating in each of the webinars! Special thanks to our speakers: Bill Shaw of the USDA/FSIS, Lee Ann Dea and Stephanie Nguyen of ConAgra Foods and Judy Lindsey of Product Dynamics. IMPI would also like to thank ConAgra Foods for sponsoring the series.

Our Fall Webinar Series will take place in September and November of 2016 and focus on Industrial Microwave Applications. More info will be added to www.impi.org this Summer.

Webinars are COMPLIMENTARY for all IMPI Members! If you missed one and would like a copy of a presentation, please contact the IMPI Office. If you have a topic you would like us to explore next Spring, please let us know!

President Message Continued

Daily I receive a number of science & technology e-newsletters and it seems each one of them reveals something that didn't exist the day before. (Obviously it did, but had been made public yet.) As a result, in order to remain relevant in any scientific or technical field it is important that individuals keep abreast of the advances in their fields. That is why the events IMPI holds throughout the year are so important to its members and are of relevance and importance to those non-members who are active in our diverse disciplines. The interests of our members is astonishingly diverse: food and agriculture, medical applications, industrial heating, solid-state, plasmas, microwave enhanced chemistry, and so much more, and it is a challenge just to provide the up-to-date information each of us needs. This is why I find what we do in IMPI so exciting!

This brings me around to writing about some of the IMPI activities I hope you will all attend or take part in. This Spring, for example, we've just completed the second of a three-part webinar series addressing food safety issues. In the Fall, it's likely that we'll be looking at issues surrounding industrial microwave and RF heating.

Our big event this year is IMPI 50, our 50th anniversary Symposium that will be held at the Caribe Royale Hotel in Orlando Florida June 21 – 23. There will be a series of what promises to be fascinating presentations. For example, our two keynote speakers:

- Dr. Augustine Y Cheung, President and CEO of Medifocus Inc.: "The Use of Microwave Power For The Treatment of Cancer"
- James Poole III, President of TurboChef Technologies Inc.: "Evolution and Revolution Of Microwave Technology For the Commercial Kitchen"

On Tuesday, June 21, we are starting the Symposium in the early afternoon, and we've invited the leaders of the various international microwave societies and other guest speakers to give presentations about their activities. You are all invited to this special event which is included in your registration fee.

As to the Symposium program, our many sessions, some of them parallel sessions, contain papers on Medical Applications, Dielectric Properties, Solid-State Technology, Food Science and Technology, Industrial Applications, Plasmas, and more. (You can see the full schedule of events [here](#)) there will be a special panel regarding Standards: long time IMPI member, Gordon Andrews of the UK, is the British representative to the IEC microwave oven standards committee, and will initiate a discussion regarding the refusal of the IEC to adopt the long-standing British microwave oven standard, and that will have serious effects on both the British food and microwave oven industries, as well as consumers. I'm sure it will be a lively discussion.

In October, IMPI will hold its annual Fall Short Course, this time sponsored by the Campbell Soup Company. We are actively working on the program and your input as to topics and speakers would be very welcome.

On the international stage, the last week in July will see the Third Global Conference on Microwave Energy Applications (3GCMEA): at the Faculty of Business at the Universidad Politécnica de Cartagena, in the Spanish tourist city of Cartagena during 25-29 July, 2016.

Continued on Page 4

Ask the Expert

During the recent Food Safety webinar there were two questions whose answers need further clarification:

1. Q. Where is the best place to put a product on a turntable in a microwave oven?

A. For most food products, it's best to place the product out near the edge of the turntable because that way it makes a full rotation through the hot and cold spots, while placing it in the center basically has it rotating around itself. However, there is a common misconception that the center of the turntable; is a cold spot. This is not true and varies from oven to oven. In many ovens the hottest place is dead center above the shaft of the turntable in others it's out near the edge and the center may be cooler; and in others there is not too much difference. (I am using the terms hottest and coolest loosely to describe the place of most intense microwave heating – a hot spot, or less intense - a cold spot) This can have a profound effect upon the heating of small samples, for example, 1 to 3 ounces, particularly cylindrically shaped. In my laboratory, in one microwave oven a one-ounce cylindrical container of wax near the edge of the turntable reached approximately 140°F in one minute, while it exceeded 400°F in one minute when placed in the center. However, in another microwave oven the temperature profile may be different. The following table shows the temperatures reached in the same one-ounce cylindrical containers filled with vegetable oil tested in three different domestic microwave ovens

| Microwave Oven | Temperature Center (F) | Temperature Edge (F) |
|----------------|------------------------|----------------------|
| A | 326 | 159 |
| B | 169 | 202 |
| C | 264 | 233 |

We are continuing our studies to see what effects these non-uniformities may have upon larger samples.

2. Q. How can consumers know the output power (watts) of their microwave ovens?

- A. Other than a general idea, they really can't. This is a serious problem that results from two issues:
- There is no mandatory test procedure that a microwave oven manufacturer must use in order to describe the output power of any microwave oven. In other words, a manufacturer can use whatever procedure it wishes to describe an oven-model's wattage and put that number on the carton, descriptive literature, or wherever and that will be what consumers see. Some recent work published in the JMPEE showed that the output power,, determined by IEC 705 of eight brand new "1100 & 1200 watt" ovens was 12% to 25% lower than the manufacturers' claimed wattages.
 - Whatever wattage number appears on the carton of the microwave oven or elsewhere, it's an average number, meaning that if you take 50 microwave ovens of exactly the same model made consecutively on the same production line, and then test the wattage output by procedures such as IEC 705 or 60705 you'll find that their wattages vary by at least +/- 15% and perhaps much more oven-to-oven.

Do you have a question you would like to appear in our Ask the Expert column?

Please email molly.poisant@impi.org for consideration.

President Message *Continued*

Several IMPI members, including Vadim Yakovlev, Juming Tang, Sumeet Dhawan and yours truly, will be presenting plenary talks. These global conferences are held every four years in different parts of the world (1GCMEA: Japan; 2GCMEA: USA) and are the result of interactive efforts by several international microwave societies: Microwave Working Group; AMPERE; Japanese Society of Electromagnetic Wave Energy; IMPI, Chinese Microwave Society. While the program has not yet been completed and issued, I am confident that it will be outstanding, containing many interesting papers. Also, it is located on the Mediterranean and is a great vacation spot.

I want to call your attention to Issue # 1, Volume 50 of JMPEE, which was published for the first time by Taylor and Francis. Editor-in-chief Juan Aguilar indicated that this first-line time cooperative effort went very well.

Finally, April means the beginning of trout fishing season so, along long with all my IMPI and other microwave-related activities, I hope to be out on the stream pounding the water into a froth as I try to outwit my first trout.

All the best, Bob



News from Around the Web

[Global countertop microwaves consumption 2016 market research report scrutinized in new research](#)

What Is [Solid-State RF Energy?](#)

Harvard Study: [Microwave Cooking and Nutrition](#)

[Discover the Global built-in microwaves industry forecast to 2021 with key companies profile, supply, demand, cost structure, and SWOT analysis](#)

New report shares details about the [United States Microwave Ovens Industry Market](#) Research Report for 2016

Restaurant Microwave Use: [Bad at Cooking, Good at Reheating](#)

[New Microwave Imaging Approach](#) Opens Nanoscale View on Processes in Liquids

Power-Frequency EMFs [Promote Cancer in Massive Animal Study](#)

MTA-UK has given us [permission to share their newsletter](#).

Editor's note: Have you ever wondered why food processors and the FDA recommend consumers heat microwavable foods to 165°F or 70° C? This excellent article by Nigel McCulloch, a Senior technologist at Bakkavör Group in the UK, appeared in the Highlights Newsletter of the MTA – UK in the summer of 2015, and we gratefully reproduce it here.

Calendar of Events

50th Annual Microwave Power Symposium, June 21-23, 2016, Caribe Royale Suites, Orlando, FL, USA: www.impi.org

3GCMEA, July 25-29, 2016, Cartegana, Spain. <http://cpcd.upct.es/3gcmea/>

IMPI's Fall Short Course, October 25-27, 2016, The Penn View Hotel, Philadelphia, PA, USA

Do you have an upcoming event for us to list here? Email molly.poisant@impi.org for inclusion.

CALL FOR EARLY IMPI PHOTOS, MEMENTOS, STORIES

Did you take part in one of IMPI's early Symposia? Do you have photos, mementos or stories you would be willing to share with us? Please contact molly.poisant@impi.org if you are willing to share your memories with us. We have some special plans in place to showcase IMPI's remarkable history at the IMPI 50 Symposium in June!



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