

THE WAVE



The newsletter publication of the International Microwave Power Institute

July 2020



IMPI 54 Symposium Held Virtually for First Time

For the first time in IMPI's history, the 54th Annual Microwave Power Symposium (IMPI 54) was held virtually, June 15-18, 2020. Eighty-five participants, from 15 countries, took part in the event.

The Symposium was to take place in Savannah, Georgia, USA, but an in-person event was not feasible given the safety concerns and travel restrictions brought on by the COVID-19 pandemic. Dr. Graham Brodie, University of Melbourne, served as the Technical Program Chairman for IMPI 54.

Seven students participated in the Student Competition. Top honors went to Mr. Yonas Gezahegn, Washington State University, for Best Oral Presentation; Ms. Zhi Qu, Washington State University for Best Poster Presentation; and Mr. Yuhei Arai, Sophia University, received Honorable Mention. All winners received a certificate, 1-year student membership to IMPI and a cash award.

Dr. B. Reeja Jayan, Carnegie Mellon University, provided the keynote address. Invited papers were presented by Dr. Josip Simunovic, North Carolina State University/SinnovaTek; Mr. Steven Drucker, Droaster Laboratories; and Mr. John F. Gerling of Gerling Consulting.

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Cover Photo from left to right:
Student Competition Chairman, Dr.
Candice Ellison, Leidos/NETL and
Winners: Yonas Gezahegn, WSU
(Best Oral Presentation), Zhi Qu,
WSU (Best Poster Presentation) and
Yuhei Arai, Sophia University
(Honorable Mention)

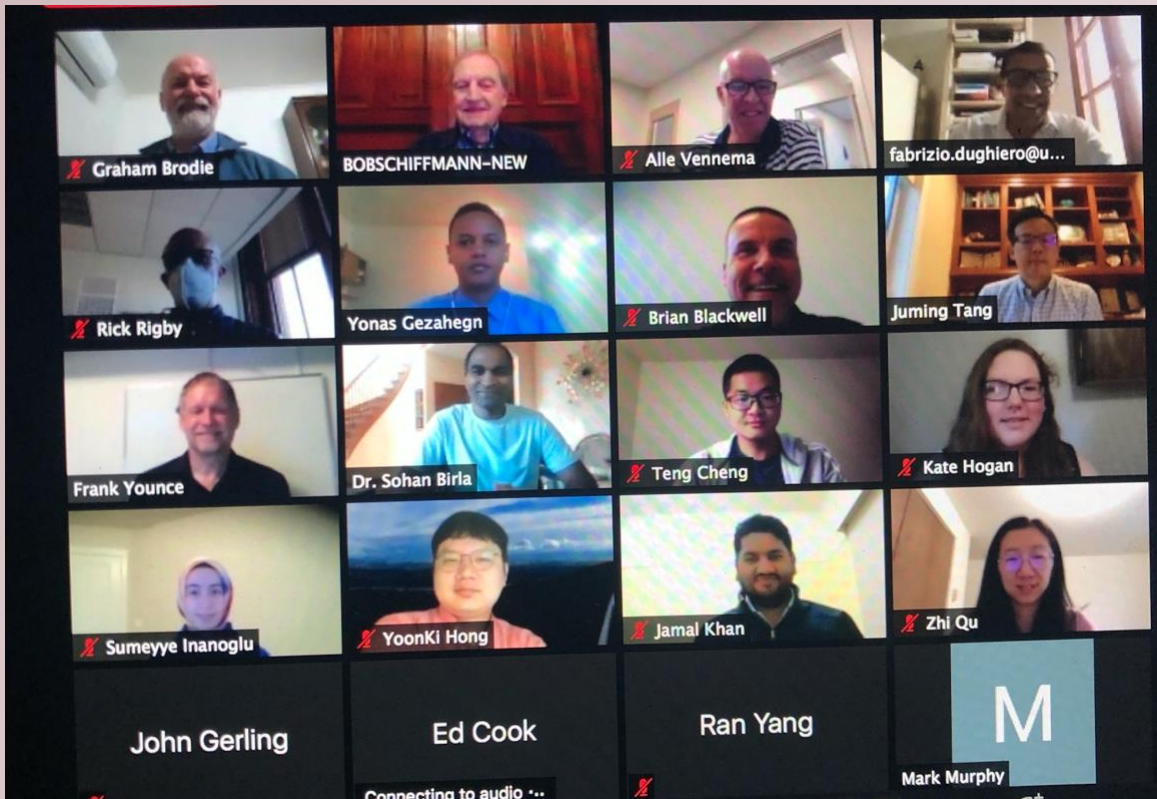
IMPI 54 Symposium Continued

In addition to the keynote and invited papers, over twenty authors provided oral presentations. Topics included Industrial Processing, Modeling, Solid State, Microwave Equipment & Ovens, Food Processing and Food Safety. IMPI's Solid State RF Energy Section, held a 4-hour Solid State Cooking Workshop on the final day.

Seven of IMPI's Corporate Members participated in our Virtual Exhibitor Showcase: Mini-Circuits, MKS, Muegge GmbH, Odyssey Technical Solutions, pinkRF, SAIREM, and WavePIA.

IMPI's President, Mr. Bob Schiffmann offered the following when asked about the Virtual Symposium, "The main lesson we learned from moving to a virtual symposium is that it's not an easy task. In order to hold a smooth-running meeting, there are many steps to consider. This meant preparing instructions & scripts for the participants, presenters, session chairs, hosts and administrators. By holding mock sessions, the team was able to identify problems and to develop workarounds for them. We also considered how provide for the networking that occurs during coffee breaks, lunches etc. This resulted in the virtual meet and greets, coffee breaks and happy hour, so the participants were able to identify themselves and interact with each other. The audience felt free to ask many questions and add comments to the presentations. We replaced on-site exhibits, with "exhibitor showcases" at the end of each morning's technical sessions, in which a majority of our planned exhibitors took part. So, what we learned is, it is possible to hold a successful virtual symposium, but it takes a lot of hard preparatory work to achieve success, and to avoid chaos."

The 55th Annual Microwave Power Symposium (IMPI 55) will be held at the DeSoto Hotel in Savannah, Georgia, USA from June 28-30, 2021. The Call for Papers for IMPI 55 will open on September 1, 2020. Additional details on IMPI 55 will be added to the IMPI website in the coming months.



Additional photos from IMPI 54 can be found on page 8.

PRESIDENT'S MESSAGE

Wow, what a year this has been. Who would've imagined, at this time last year, where the world would be today. Here we are, the entire world facing and battling a common enemy. Not even World Wars 1 & 2 created such a response, and, the battle is far from over. Call me a pessimist, but with some knowledge of microbiology and human behavior, my belief is that this pandemic is going to be with us for a very long time. I live in a residential area in New York City and it is rare for me to see anyone walking around the street without a facemask. So, when I look at TV and see crowds of people beaches, on board walks, or gathering outside restaurants and bars, almost none of whom wear facemasks or obeying the "social distancing" guidelines, I'm horrified. Come on folks, you may feel invincible, but there are some of us who are vulnerable because of age and medical conditions. My wife and I fit those categories, so we began our quarantine in early March, and we'll continue until we finally feel safe.

Much of this issue of the IMPI Newsletter is devoted to our first virtual symposium, IMPI 54. It is fortunate that Molly, I, others recognized the potential danger should we try to hold an onsite symposium in Savannah this June. This early recognition of the impact of the pandemic allowed us to negotiate cancellation, without penalty, of our hotel contract. Then began the hard work of putting together a virtual symposium. None of us had any idea of how difficult the task would be, but as we started working, the barriers and problems became clear. I can't thank enough the many persons involved in this effort, but let me begin with Molly, Alicia, John Gerling, Eric Brown, and kudos to the many other people involved in the planning and execution of IMPI 54. The follow-up survey indicates that the participants felt we were quite successful. I also want to thank the presenters and participants for having the faith in us and making it a very successful symposium.

Since its birth in 1966, IMPI has held an annual symposium; during the initial years we rotated between United States and Canada (How many of you know that IMPI began as a Canadian chartered organization?). In 1970 we extended our conferences to Europe, so the rotation schedule became United States, Canada, Europe, and successful European conferences were held in 1970, 1973, 1976 and 1979. Unfortunately, it became burdensome for many of our members to travel to Europe, so we dropped that portion of the symposium scheduling, and went back to the USA/Canada scenario; these last year's our symposia have been held exclusively in United States. The cessation of European IMPI symposia led to the formation of AMPERE under the guidance of Dr. Ricky Metaxas, giving European researchers & educators the opportunity to meet, introduce and discuss their research, and more. However, this also led to reducing European participation at our symposia, and attendance dropped significantly. We are now considering the future of IMPI symposia and other meetings until the pandemic is reasonably under control, and thereafter.

Among the positive things came out of the virtual symposium, was the idea of including some IMPI 54 presentations as part of our webinar series, under the direction of Sean McKeown. You'll learn more about this elsewhere.

As you'll learn in this Newsletter, the IMPI Board of Governors has voted me to be IMPI's President during the 2020 -2021 term. I am grateful for their trust and support. I'm also pleased to be part of directing IMPI's activities and future at this difficult time.

I want to take a moment to recognize Mark Watts who served on our Executive Committee (first as Secretary then as Vice President) since 2017. Mark was very involved in IMPI's activities and contributed to their organization and success. Mark has moved on, and removed himself from the IMPI Executive Committee. Mark – thank you – I appreciate all you've done! You will always have the friendship and support of IMPI. Good luck with your new company.

Finally, my thanks to our Executive Director, Molly. Her hard work and devotion have made IMPI grow and run smoothly; and also, to IMPI's Administrator, Alicia Standridge, who ensures our members are taken care of and that all the little details are covered.

So friends, I wish you all a safe, healthy and enjoyable summer.

Bob Schiffmann, IMPI President



IMPI Elects Board of Governors & Executive Committee

The IMPI membership unanimously voted in favor of electing the Slate of Candidates put forth by the Nominating Committee. On June 22nd, the following IMPI members were elected to the Board of Governors for a 3-year term. Congratulations to:

Mr. John F. Gerling, Gerling Consulting
Ms. Marie Jirsa, Tyson Foods
Dr. Sean McKeown, Graphic Packaging International
Mr. Roger Williams, 3D RF Energy Corporation

IMPI's Board of Governors convened virtually on June 23rd to plan for the year ahead and elected the Executive Committee. Congratulations to IMPI's Executive Committee, who will serve a 1-year term.

EXECUTIVE COMMITTEE



President
Mr. Bob Schiffmann
R.F. Schiffmann Associates



Vice President
Mr. John Mastela
Elite RF



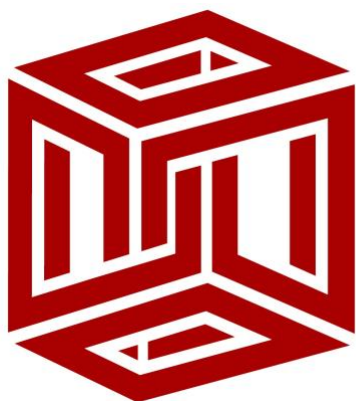
Treasurer
Mr. John Gerling
Gerling Consulting



Secretary
Mr. Jerome Czajkowski
Muegge-Gerling

[IMPI's Board of Governors](#) will continue to meet virtually every other month; the Executive Committee meets in the interim months. We welcome any suggestions the IMPI membership has for Board consideration.

IMPI Welcomes Our New Corporate Member!



3D RF ENERGY

JMPEE Impact Factor Increases

The 2019 Impact Factor for JMPEE stands at 1.237, which is a healthy increase. The journal now appears in Q3 on the JCR list for the category Chemical Engineering (Rank 100/143). For Electrical & Electronic Engineering it is ranked in Q4 (204/266). Many thanks to our Editor-in-Chief, Dr. Juan Aguilar Garib for his efforts.

Volume 54: Issue 2 Now Available to Members

Editor's message: microwave processing of modern materials

Juan Antonio Aguilar Garib

The impact of pins on dual-port microwave heating uniformity and efficiency with dual frequency

Guichao Xiong, Huacheng Zhu, Kama Huang, Yang Yang, Zhipeng Fan & Jinghua Ye

Comparing nutritional levels in a commercially-available single-serve meal using microwave versus conventional oven heating

Eric F. Brown, Ric R. Gonzalez, Tab Burkman, Tim Perez, Indarpal Singh, Kristin J. Reimers & Sohan L. Birla

Model for drying of Eri silkworm pupae with microwave and hot air combination

Mongkolchai Kampagdee, Nattapol Poomsa-ad & Lamul Wiset

Dielectric properties of polyols, at frequency range 0.2–3 GHz and temperature range 293–473 K: an analysis in the frequency and temperature domain

Deibnasser C. Campos

On the efficacy of dielectric spectroscopy in the identification of onset of the various stages in lactic acid coagulation of milk

Aswini Harindran & V. Madhurima

Access to Volume 54 (and the entire JMPEE Archive) is available to members as part of your membership. Contact alicia.standridge@impi.org if you need your log in information resent to you.

MEMBER NEWS

Odyssey Takes Steps Towards a [Leading Role in US Food Safety](#)

Do you have member news, either professional or personal you would like to share in the next edition of The Wave? Please send your news to molly.poisant@impi.org

Solid State RF Energy Section Update

by Dr. Klaus Werner, Section Chairman

The Section held a **Solid State Cooking Workshop** in conjunction with the IMPI 54 Symposium on June 18th. Twenty-five attendees and presenters participated in the 4-hour workshop. The Section plans to hold these workshops on variety of topics, at both the beginner and advanced level, at least twice a year.

Section Membership

The Section continues to recruit new members. Membership is open to any IMPI member and there is no fee to participate in 2020. Those interested in joining the Section should email alicia.standridge@impi.org

Section Workgroups on “Tagging” and “PA Roadmap” in Operation

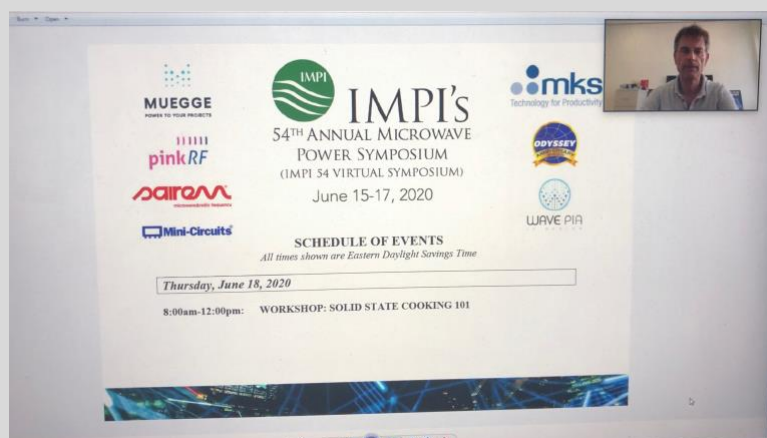
Two workgroups have commenced operation:

“Tagging” is working on a formal language to describe a microwave ovens food load in order to exploit the benefits that solid-state driven microwave ovens provide on “any” pre-packaged food item. The tagging initiative is going strong with Steve Drucker at the helm. A well organized and structure team is working to identify a formal descriptive open source language to describe CPGs and other food items to cook in solid state ovens. Food scientists, CPG producers, packaging specialists and bring all necessary expertise to the table.

The “PA Roadmap” workgroup will revisit earlier technology forecasts and update the predictions on what a power amplifier should look like and how it should behave for the coming years.

Section Web page

The Section webpage is up and running and we will add content continuously. Make sure you [stop by to see it](#) developing. Also, if you and/or your company would want to place non-commercial, tutorial or RF Energy related “nice to know” on our web page or Events Calendar, please contact alicia.standridge@impi.org with the details.



Dr. Klaus Werner and Mr. Steven Drucker were two of the presenters at the June 18, 2020 Solid State Cooking Workshop

Welcome to IMPI 54

- 85 registrants for our first Virtual Symposium!
- 15 countries represented (Australia, Brazil, France, Germany, Hong Kong, Israel, Italy, Japan, Mexico, Netherlands, South Korea, Sweden, Switzerland, United Kingdom and the USA)
- 9 Students Competing in the Student Competition (Student posters are available on the main virtual Symposium page)
- 25 oral presentations
- 7 Companies participating in the Exhibitor Showcase
- Solid State Cooking Workshop to be held on Thursday

Microwave to the Rescue?

AT THE START OF EVERY DISASTER MOVIE THERE'S A SCIENTIST BEING IGNORED

Food Safety Through Technology

Composite Materials in Aerospace Industry

Boeing 787:

- By volume: 80% composites
- By weight: 50% composites, 20% aluminum, 15% titanium, 10% steel, and 5% other.
 - 32 tons of CFRP composites made with 23 tons of carbon fiber.

Airbus A350 XWB:

- By volume: 83% composite
- By weight: 52% composites, 20% aluminum-lithium alloys, 14% titanium alloys

Source: [Pike, 2006] and [Kinsley-Jones, 2006]

Source: [Gurgulu, 2015]

UNIVERSITY OF BIRMINGHAM WPI IMPI

Recording Paused

1/3

Electromagnetic (EM) Field Effects in Ceramics

EM fields can influence ceramic synthesis and processing in ways not observed using conventional methods.

Low temperature crystallization

b 20 mL TEG, 60 min hold at 150 °C
Anatase peaks, ITO substrate

Intensity (arbitrary unit)

2-theta (degree)

Microwave

Conventional

CALENDAR OF EVENTS

IMPI's Calendar of Events is [available here](#).

If you have an event you would like to feature on our Calendar, please send your event details to info@impi.org by the 15th of the month.

News from Around the Web

Improved catalyst production [lowers electrolysis costs](#)

[Experts Say There is a Very "Low Risk"](#) of Unknown Health Hazards from Exposure to 5G Wireless Networks

Galanz Simplifies Canadian Cooking with [Multifunctional Appliances](#)

Fossil Fuel-Free [Jet Propulsion with Air Plasmas](#)

The International Microwave Power Institute

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