

THE WAVE



The newsletter publication of the International Microwave Power Institute
July 2019 – Special Symposium Edition



IMPI Holds 53rd Annual Microwave Power Symposium (IMPI 53)

One hundred-twenty-six attendees, from 18 countries, gathered at Caesars Palace in Las Vegas, Nevada for the 53rd Annual Microwave Power Symposium (IMPI 53) from June 18-20, 2019. This included 19 exhibitors, which is a new record for IMPI.

IMPI 53 featured 65 presentations (keynote, oral, poster, panel and booth side) on a range of topics including: Plasmas, Solid State, Industrial and Food Processing, Food Science, Modeling, Agriculture, Microwave Ovens and more.

Six students competed in the Student Competition. Best Oral Presentation went to Vasileios Ramopolous (Karlsruhe Institute of Technology, Germany); Best Poster Presentation went to Ali Taqi (University of Nottingham, UK). Honorable Mention went to Petra Kumi (Worcester Polytechnic Institute, USA). Students winners received a \$100 cash prize, a certificate and a one-year student membership to IMPI.

Continued on Page 3

IN THIS ISSUE

President's Message.....	2
IMPI 53 Symposium.....	3
Executive Committee Elected.....	3
Aguilar-Garib Named IMPI Fellow.....	4
IMPI 54 Venue Announced.....	4
Solid State RF Section Meets.....	5
Fall Short Course at TurboChef.....	6
JMPEE Impact Factor Released.....	6
IMPI 53 Photos.....	7-13
Calendar of Events.....	14
In Remembrance: Ralph Shute.....	14
IMPI Elects New Board Members.....	15
News from Around the Web.....	15
Connect with IMPI.....	15

Cover Photo: Eighty-five attendees of IMPI 53 enjoying the Group Dinner

PRESIDENT'S MESSAGE

While I was in graduate school at Purdue University in the late 1950s, a common site on campus was young men, wearing chinos and white button-down shirts, walking around with leather scabbards hanging from their belts. These were not Purdue gladiators, but rather engineering students and, instead of swords, these scabbards contained slide-rules (remember those?). We didn't have calculators in those days, nor did we have desktop or laptop computers; Purdue's computer occupied an entire air-conditioned building – obviously a mainframe. I have a clear memory of the first time I saw a handheld calculator, it was at an IMPI Board Meeting in Canada in the early 1970s, and all it could do was add, subtract, multiply and divide, and the results appeared in bright red on a small screen. We all were astonished and, when I returned to my laboratory, I immediately ordered one for \$125 – today we give those away for free.

Oh, how far we've come technologically. Recently, I had three young Korean engineers in my laboratory and they were astounded to see a rotary dial phone on a wall (it was no longer hooked up, just there for show), and when I asked them if they knew what a typewriter was, they shook their heads. Now, I'm a person who grew up before there was television in our homes and, while we had an electric refrigerator when I was a child, many of our neighbors had ice delivered by horse-drawn cart, for their ice-boxes; and this was New York City! Now, we 3-D print body parts; find astonishing new ways to attack cancers; restore brain-function to 4-hour deceased & decapitated old pig brains, and so much more. I remember a science fiction story I read as a child, in which a character was in the desert and pulled out a cup which he filled with water pulled from the desert air – and recently, as if by magic, that is now possible.

July 20 is the 50th anniversary of Apollo 11 and Neil Armstrong stepping onto the moon, a technological feat of such a mind-boggling complexity that it seemed unlikely it could ever happen, and yet a total of six missions accomplished the same thing, ending with Apollo 17 in 1972. There is a wonderful documentary, "Apollo 11", that, despite having no narration, highlights a great deal of the mission, from the Saturn V rocket, weighing as much as 400 elephants, moving towards us launch-pad with a speed of a leisurely walk, and escaping from Earth with an explosion more powerful than the output of 85 Hoover Dams*. In 1962, President John F. Kennedy said, "We choose to go to the moon in this decade and do the other things, not because they are easy, but because they are hard." [Address at Rice University, September 12, 1962]. To practice good science, the scientist should never be worried about how hard a problem is (in fact I love hard problems), but rather concentrate on the problem and the search for its solution, which may take years.

The great physicist and Nobel Laureate once said: "One of the ways of stopping science would be only to do experiments in the region where you know the law... In other words, we are trying to prove ourselves wrong as quickly as possible, because only in that way can we find progress".

So, on July 20, when I remember the awe I felt watching my black-and-white television set and Armstrong's footprint on the moon surface, I'll also be thinking about all of those slide rules clicking away in order to get him and his crew to the moon and back. Finally, did you know that "Apollo 11 was landed on the moon using a computer that had 1,300 times less processing power than an iPhone 5s?" ** Talk about solving hard problems!

Best wishes for the summer,



Bob Schiffmann

* Scientific American, July 2019

** IPHONE Guru, August 22, 2014

IMPI 53 Symposium Continued

Dr. Kenneth Foster, Professor of Bioengineering at the University of Pennsylvania, and Michael Wolf, Founder of the Smart Kitchen Summit and Publisher of The Spoon, delivered the two keynote addresses as IMPI 53. Invited papers were delivered by Dr. Klaus Baumgaertner of Muegge GmbH, Dr. Eleanor Binner of the University of Nottingham, Mr. Christopher Hopper of IBEX and Dr. Alain LeBail of ONIRIS. Dr. Klaus Werner, former Executive Director of the RF Energy Alliance, led a panel discussion focused on IMPI's newly formed Solid State RF Energy Section and their plans for the future.

New this year, the Symposium featured an Exhibitor Spotlight the afternoon of Tuesday, June 18th. Each of the 19 exhibitors engaged with attendees during two twenty-minute booth side demonstrations. A Welcome Reception followed, featuring a live microwave cooking demonstration by Jennipher Marshall-Jenkinson of the MTA-UK. Attendees also participated in networking luncheons and a Group Dinner at Pizzeria Monzu.

Dr. Graham Brodie of the University of Melbourne and Mr. Roger Williams of 3D RF Energy Corp served as the Co-Chairmen of the Technical Program Committee; Dr. Ulrich Erle of Nestle R&D chaired the Food Science & Technology Program Committee. Dr. Candice Ellison of Leidos chaired the Student Competition.

During the closing ceremony on June 20th, IMPI announced the venue for the 54th Annual Microwave Power Symposium. IMPI 54 will be held June 15-17, 2020 at the historic DeSoto Hotel in downtown Savannah, Georgia. The Call for Papers for IMPI 54 will be released on September 1, 2019.

IMPI Elects Executive Committee for 2019-2020 Term



Following the June 19th, General Membership Meeting, IMPI's Board of Governors elected their leadership team for the year. The 2019-2020 Executive Committee Members, as featured above from left to right, include: Mr. John Gerling of Gerling Consulting (Treasurer), Mr. Bob Schiffmann of R.F. Schiffmann Associates (President), Mr. Mark Watts of the Campbell Soup Company (Vice President) and Mr. John Mastela of PrecisePower (Secretary).

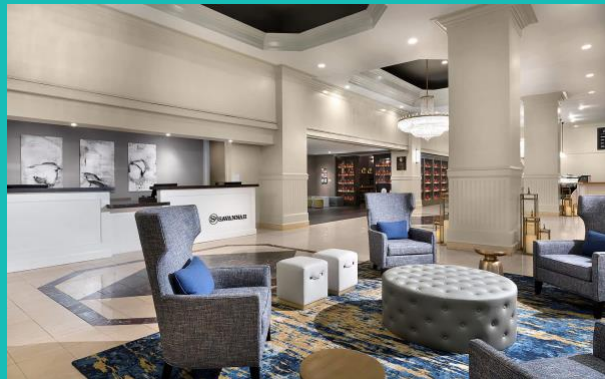
AGUILAR-GARIB NAMED IMPI FELLOW



Congratulations to Dr. Juan Aguilar-Garib of the University of Nuevo Leon, on becoming the 35th Fellow of the International Microwave Power Institute. Aguilar-Garib, who has served as the Editor-in-Chief of JMPEE for over a decade, is shown above receiving his Fellow plaque from IMPI's President, Bob Schiffmann, also a Fellow, on June 19th. Read the full [press release here](#).

IMPI 54 TO BE HELD IN SAVANNAH, GEORGIA, USA

Save the date for the 54th Annual Microwave Power Symposium (IMPI 54), which will be held June 15-17, 2020 at the historic DeSoto Hotel in Savannah, Georgia, USA. The Call for Papers will be released on September 1st at www.impi.org



SOLID STATE RF ENERGY SECTION HOLDS KICKOFF MEETING

by Klaus Werner, Chairman, Solid State RF Energy Section

The “Solid State RF Energy Section” day on Friday, June 21st, in Las Vegas, was met with a lot of interest and energy by the IMPI community. The Section welcomed more than 20 interested colleagues from a very diverse spectrum of companies – exactly in line with the vision and mission of the Section to foster the solid state RF technology adoption based on broad interest and collaboration across the entire value chain up to the end users.

During the day, we reviewed the Section’s charter, identified the remaining organizational homework, looked at possible activities going forward and elected the officers. To the latter, Klaus Werner of pinkRF, David Lester of NXP, and John Gerling of Gerling Consulting were elected Chairman, Secretary and Treasurer, respectively. John Mastela of Precise Power and Sanghun Lee of WavePIA were elected Deputy Chairmen for the Americas and AsiaPac. The Deputy Chairmen’s main role is to represent the Section within their region and hence to save on travelling time and cost for the organization.

In terms of activities to pursue, we discussed the generation/continuation of the earlier roadmap discussion, and the creation of a workgroup to define a tagging language to describe food items, packages and recipe content to cook foodstuff in a compatible solid state RF driven oven. Furthermore, we had Lance Wilson from ABI Research on the phone to discuss with us the overall RF Energy markets and the (possible) introduction of the technology in consumer microwave systems.

Everyone who is interested to join *and* work on the topics is welcome to join. Membership in the Solid State RF Energy Section is open to any corporate, professional or student member of IMPI. To join this Section, please email Alicia Standridge at admin@impi.org The Section’s next meeting will be held in conjunction with IMPI’s Fall Short Course in Carrollton, Texas in November. More details will follow.



IMPI Fall Short Course to be Held at TurboChef Headquarters

IMPI's Fall Short Course will take place November 6-8, 2019 at TurboChef Headquarters in Carrollton, Texas. The 2 ½ day event is expected to bring together about 50 attendees to examine topics such as: Consumer Trends and Behavior, Food Safety, Sustainability in Microwave Packaging, Advancements in Food Service, Opportunities in Microwave Cookware, Solid State Cooking and more. IMPI's Fall Short Course will feature a 4-hour Microwave Fundamentals Pre-Short Course, instructed by Mr. Bob Schiffmann on November 6th, a tour of the TurboChef facility and various networking opportunities. The full program is expected by August 1st and registration will open at that time. Program Updates will be [added here](#) as they become available.



JMPEE IMPACT FACTOR INCREASES IN 2018

IMPI's peer-reviewed scientific Journal of Microwave Power and Electromagnetic Energy (JMPEE) showed increased readership and citations in 2018. According to *Clarivate Analytics*, who released the 2018 scores last week, JMPEE's Impact Factor increased from 0.0575 in 2017 and 2016 to 0.0850 in 2018. The Impact Factor without Self Citations (also 0.0850) was the highest score the Journal has on record for the past twenty years.

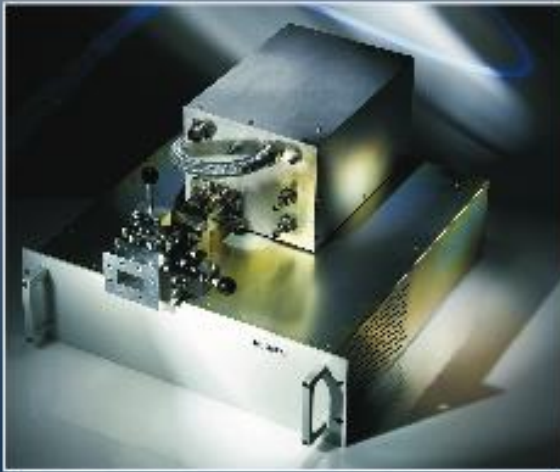
JMPEE has thrived in recent years under the leadership of Dr. Juan Aguilar-Garib and the management of renowned UK publisher, Taylor and Francis. All IMPI members receive complimentary online access to the current volume of JMPEE and the JMPEE archive. If you are not utilizing this benefit, please contact IMPI Executive Director, Molly Poisant, at molly.poisant@impi.org and we will get you started.

IMPI 53 SYMPOSIUM – JUNE 18-20, 2019 – CAESARS PALACE, LAS VEGAS, NEVADA, USA





A Microwave Solutions Company



**Microwave Generators • Waveguide Components
Magnetrons • Measurement Devices**

**Reliable & Cost Effective • Advanced Switch-Mode Technology
Proven Industry Track Record • Flexible Designs & Integration**

Muegge GmbH is your ideal partner for microwave technology in advanced industrial heating and plasma applications. The engineering and manufacturing capabilities of our highly qualified staff establishes Muegge GmbH as a world leader in microwave systems and components. Muegge GmbH brings technical expertise and extensive application competence in the development, production and implementation of high-power microwave technology and provides unique solutions for your technical challenges. Our portfolio includes **microwave generators, waveguide components, magnetrons, plasma systems, and plasma components.**

MUEGGE GMBH
Hochstraße 4-6 · 64385 Reichelsheim
Fon +49 (0) 6164 - 93 07 0 · Fax +49 (0) 6164 - 93 07 93
info@muegge.de · www.muegge.de

IMPI 53 SYMPOSIUM – JUNE 18-20, 2019 – CAESARS PALACE, LAS VEGAS, NEVADA, USA

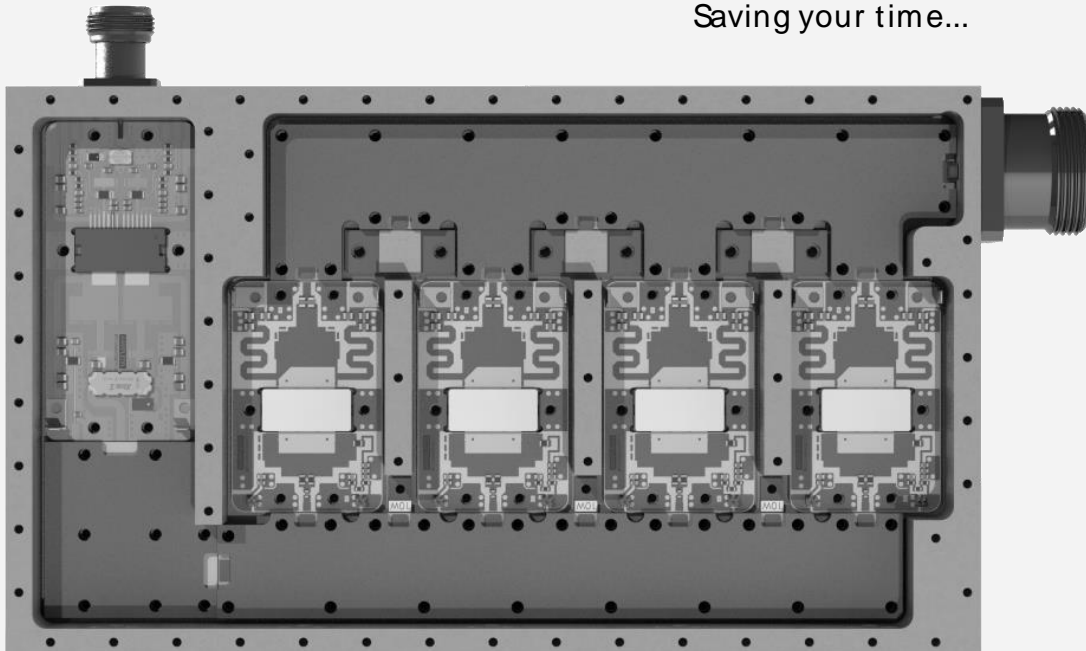


IMPI 53 SYMPOSIUM – JUNE 18-20, 2019 – CAESARS PALACE, LAS VEGAS, NEVADA, USA



AMPLEON

Saving your time...



Get started with our **High Power Amplifier Designs** based on **easy-to-use** 915 MHz & 2.45 GHz RF Energy **Power Modules**



www.ampleon.com/rf-energy-modules

PrecisePower™ A Crescend Company

High-Power Solid-State Microwave Generators

- A fusion of solid state technology and exceptional software that puts a powerful new tool into the hands of microwave systems innovators.
- Rugged and reliable, capable of driving varying loads. Single or multiple independent RF outputs.
- 900 MHz or 2400 MHz ISM Bands with precise auto power control, frequency sweeping, phase control, and auto tuning.
- Scalable and modular, with achievable output powers of:
2.5 kW to 100 kW for 900 MHz and 1 kW to 16 kW for 2400 MHz



PrecisePower, LLC
140 East State Parkway
Schaumburg, IL 60173 USA
847-908-5400
www.crescendtech/precisepower



IMPI 53 SYMPOSIUM – JUNE 18-20, 2019 – CAESARS PALACE, LAS VEGAS, NEVADA, USA



3D RF ENERGY

—*Making the Impossible Possible*

Bringing solid-state technology and expertise to Microwave Energy with

- generators & development tools
- product design & manufacturing
- application support



www.3drfe.com



info@3drfe.com

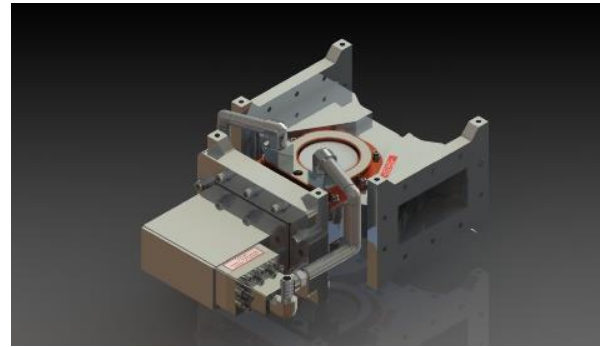


Ferrite

Microwave Technologies

We are now supporting your industrial needs in 915 MHz as well as 2.45 GHz. Our new standard 3 kW and 6 kW devices feature lower loss, better match and better isolation

For more than 30 years, we have designed and built the world's most advanced industrial microwave systems and high-power microwave components



IMPI Thanks Our IMPI 53 Sponsors!

Muegge GmbH – Gold Sponsor

Ampleon & PrecisePower – Silver Sponsors

Ferrite Microwave Technologies – Bronze Sponsor

Shanghai Ocean University - Proceeding Sponsor & 3D RF Energy Corp – Group Dinner Sponsor

**If your company is interested in a Sponsorship for IMPI 54, please contact*

molly.poisant@impi.org



Shanghai Ocean University has a history of 106 years. The university accommodates more than 12,300 full-time undergraduates, 2,380 full-time graduate students, and 1,200 faculty members and staff.

Engineering Research Center of Food Thermal-processing Technology has been founded in 2013 with a research focus on Microwave and Radio frequency (RF) application in food processing, including Sterilization /Pasteurization, Thawing/Tempering, Drying, and etc.

We welcome visits, research collaborations and student/faculty exchange!



CALENDAR OF EVENTS

AMPERE, September 9-12, 2019 in Valencia, Spain. [More details here.](#)

IMPI is proud to be an Event Partner for the **Smart Kitchen Summit**, October 7-8, 2019 in Seattle, Washington. Use [our discount code IMPI](#) to get 25% off tickets now!

IMPI Fall Webinar Series, October/November 2019. More details to follow.

IMPI's Fall 2019 Short Course, TurboChef Headquarters, Carrollton, Texas, USA, November 6-8, 2019. Registration will open on August 1.

54th Annual Microwave Power Symposium (IMPI 54), June 15-17, 2019 at the historic DeSoto Hotel in downtown Savannah, Georgia, USA. Call for Papers will be released on September 1.

Solid State RF Energy Section Meeting, June 18, 2019, The DeSoto Hotel, Savannah, Georgia, USA

4GCMEA, August 17-20, 2020, Chengdu, China. [Call for Papers here.](#)

IN REMEMBRANCE

It is with great sadness that I must announce the death of Ralph Shute of the UK. Ralph was an early member of IMPI and a well-known microwave engineer in the UK. He was a pioneer in the application of microwave energy to industrial processing and responsible for a number of successful industrial microwave systems. His death, on April 22, 2019, was brought to my attention by my colleague, and IMPI's friend, Gordon Andrews, who said about Ralph, "...he was certainly well known as a major innovator and jovial character to many in the microwave industry...". We send our condolences to his family.

Bob Schiffmann

Not a Member of IMPI? We think you should be...

Once a year, we make this member newsletter available to our broader microwave and RF community. If you are interested in joining IMPI to receive this newsletter, access to JMPEE, four complimentary webinars each year, member pricing to all events and much more, please [visit our membership](#) page to learn more. Questions? Please contact IMPI Executive Director, molly.poisant@impi.org

Study: Here's Why Consumers [Don't Use Thermometers](#) While Cooking

[Microwave Technology](#) to Combat Swarms of Drones

Exploration of TiO₂ nanoparticle mediated [microwave therapy](#) on cancer treatment

Researchers Have Built a [Plasma Jet](#) That Can Touch Stuff, Like a Tiny Lightsaber

Moisture analyzer: based on [microwave transmission technology](#)

IMPI Elects New Board of Governors

During the annual General Membership Meeting on June 19th in Las Vegas, IMPI elected 4 Voting Board Members to serve a 3-year term. Jerome Czajkowski, of Muegge-Gerling, Eric Brown of Conagra Brands and Klaus Werner were elected to serve their first terms as Voting Board Members; Ulrich Erle of Nestle was re-elected to the Voting Board. The Board met for their annual face-to-face meeting on June 17th and attended a Board Luncheon at Sushi Roku (photo below). A full listing of current Board Members can be [found here](#).



The International Microwave Power Institute

PO Box 1140 Mechanicville, VA, 23111 USA

www.impi.org

Follow us on Facebook, Twitter and LinkedIn

<https://www.facebook.com/InternationalMicrowavePowerInstitute/>

<https://twitter.com/intlmwpowerinst>

<https://www.linkedin.com/company/international-microwave-power-institute>