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► **To cite this version:**

Danilo Manstretta, Francois Rivet, Mohyee Mikhemar. The 2024 RFIC Symposium. IEEE Microwave Magazine, 2024, 25 (5), pp.127-158. 10.1109/mmm.2024.3364568 . hal-04572162

HAL Id: hal-04572162

<https://hal.science/hal-04572162>

Submitted on 10 May 2024

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The 2024 RFIC Symposium

Danilo Manstretta^{1b}, *Francois Rivet*^{1b}, and *Mohyee Mikhemar*^{1b}

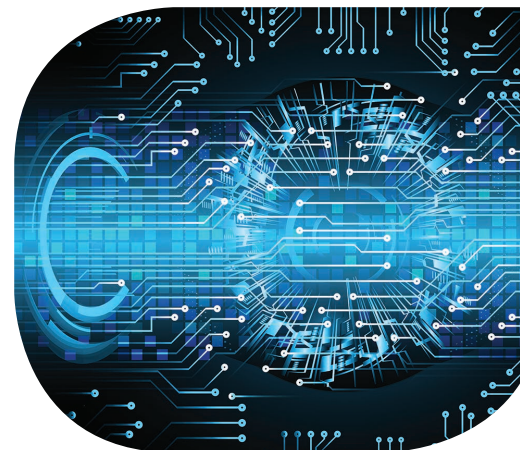
The IEEE RF Integrated Circuits (RFIC) Symposium is the premier annual forum dedicated to showcasing the latest breakthroughs and research findings across various domains related to RF, millimeter-wave (mm-wave), and wireless ICs. As an integral part of Microwave Week, the world's largest RF and microwave technical convention, RFIC continues to be at the forefront of technological innovation.

Building on the remarkable success of RFIC 2023 in San Diego, which drew more than 900 attendees, this year RFIC 2024 promises an even more significant impact. Set to take place at the Walter E. Washington Convention Center, nestled in the heart of Washington, DC, from Sunday morning, 16 June, through Tuesday



night, 18 June, the event anticipates a substantial increase in attendance. See [Table 1](#) for the RFIC 2024 program.

The technical sessions scheduled for Monday and Tuesday will cover a diverse range of topics, spanning highly integrated wireless systems on chip to power amplifiers and front-end circuits. These sessions will delve into critical areas, such as oscillators, frequency synthesizers, device modeling, and packaging and testing technologies. Exciting developments in artificial



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intelligence (AI)/machine learning (ML) applied to RF circuits, D-band circuits, 3D ICs and interconnects, wireline and optical systems, quantum

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Digital Object Identifier 10.1109/MMM.2024.3364568

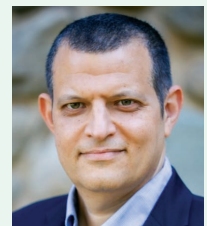
Date of current version: 9 April 2024



Danilo Manstretta



Francois Rivet



Mohyee Mikhemar

TABLE 1. RFIC 2024 program at a glance (tentative).

Date/Time	Saturday 15 June	Sunday 16 June	Monday 17 June	Tuesday 18 June
Morning	Registration	RFIC Workshops	RFIC Technical Sessions	RFIC Technical Sessions
Lunch		RFIC Technical Lecture	RFIC Panel	RFIC/IMS Panel
Afternoon		RFIC Workshops	RFIC Technical Sessions	RFIC Technical Sessions
Evening		RFIC Plenary and Symposium Showcase*	RFIC Technical Sessions	RFIC Student-Industry ChipChat

*Symposium Showcase includes student/industry paper showcase as well as the demo session of selected papers (also known as the System and Application Forum).

computing, and mixed-signal circuits as well as imaging, spectroscopy, and sensing circuits at RF through terahertz (THz) frequencies will be explored.

System-level innovations will also be presented with applications to mobile communications, radar, imaging, satellite communications, THz, biomedical, and optoelectronic systems. The scope of the conference includes innovations in IC and system architectures, usage models, calibration techniques, and integration approaches, fostering collaboration between researchers and practicing engineers on the frontier of RFICs and systems to the benefit of all.

RFIC 2024's enriching educational program on Sunday, 16 June 2023, will feature 13 RFIC-focused workshops and a technical lecture. Covering advanced topics in RFIC technology, these workshops include discussions on the following subjects:

- mm-wave technology:
 - Flexible Arrays as the Next Frontier in Wireless Communications
 - mm-Wave and Sub-THz Broadband Phased Array Front Ends for Communication and Sensing
 - Phased Arrays and MIMO for mm-wave 6G/Wi-Fi and Sensing Systems.
- Advanced power amplifiers and transmitter design:
 - Digital Intensive Transmitters From RF to Millimeter-Wave: Empowering Intelligent and High Data-Rate Wireless Communication

- Linearity and Efficiency Challenges in Wide Modulation Bandwidth Power Amplifier Design
- Ultrawideband Efficient PAs and Broadband Matching Design Techniques.
- Chiplets and 3D integration:
 - 3D Heterogeneous Integration and 3D Packaging Targeting B5G-6G mm-Wave and Sub-THz Communication and Sensing
 - The Future of Chiplet Technology and 3D Heterogeneous Integration.
- System innovations and design methodologies:
 - From Waves to Insights: AI/ML Techniques for Wireless Communications and Radar
 - Integrated Circuits for Control and Characterization of Quantum Processor

- From Prototype to Product: Overcoming Productization Challenges
- Sensing Modalities for the Road to Autonomy and Beyond
- Operating at the Extreme: RFIC Design Techniques for Operation Beyond the PDK Limits.

The event will also showcase an 80-min short course, or *technical lecture*, by esteemed Prof. Ali Hajimiri, from Caltech. This lecture promises valuable insights for students, newcomers, and seasoned designers alike.

Following the full day of Sunday workshops, the RFIC plenary session (see Figure 1 for a photo of the 2023 plenary session) will be held in the evening, beginning with conference highlights and the presentation of the Student Paper Awards and the Industry Best Paper Awards. The RFIC plenary session will conclude with two visionary plenary talks:



Figure 1. RFIC 2023 plenary session.

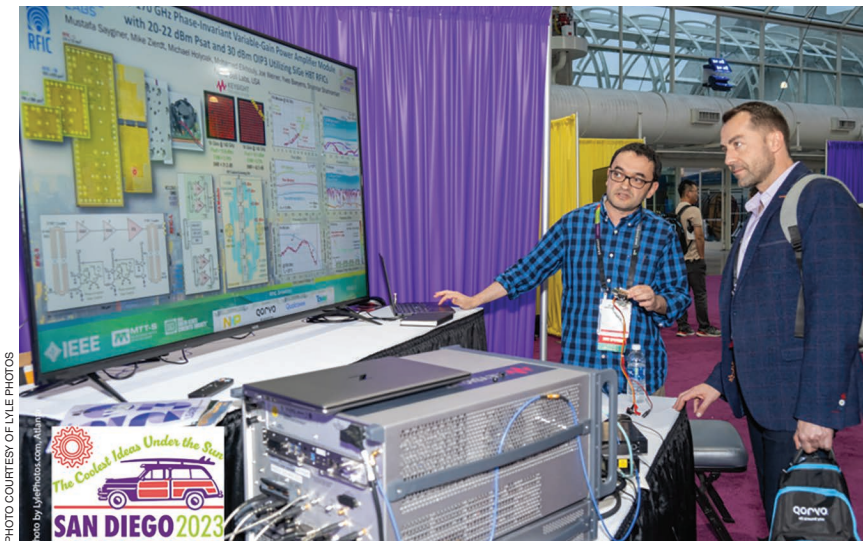


PHOTO COURTESY OF LYLE PHOTOS

Figure 2. Demo at the Symposium Showcase during RFIC 2023.



“The 6G Network at the Center”: Dr. Peter Vetter, President of Bell Labs Core Research and Bell Labs Fellow, leads an eminent global research organization with the mission to create game changing innovations that define the future of networks and insure portfolio leadership for Nokia’s core business. 6G is no longer a mere long-term aspiration. It is a framework of technologies that will become reality by the end of the decade. We are transitioning from the ideageneration phase to systematization and proof-of-concept realization. The 6G network at the center is an essential pillar equal to artificial intelligence and cloud to shape the future of human augmentation. He will share his vision on 6G, the main technology areas for 6G and provide some research highlights.

technology that have enabled the capability and affordability of computing and communication devices to improve exponentially over time, giving rise to cloud computing and the Internet of Things, which together with advances in machine learning have ushered in the era of Artificial Intelligence. To date, CMOS technology advancement has been driven primarily by market demand for faster and more energy-efficient digital computing; as such, transistor scaling to sub-10 nm technology nodes has presented challenges for analog/RF IC design. In this keynote presentation she will discuss evolutionary advancements in CMOS technology that can address these challenges, focusing on relevant figures of merit, for revolutionary impact.



“CMOS Technology Evolution for Revolutionary Impact”: Prof. Tsu-Jae King Liu, dean of the College of Engineering at UC Berkeley, will talk about the steady advancements in CMOS integrated circuit

technology that have enabled the capability and affordability of computing and communication devices to improve exponentially over time, giving rise to cloud computing and the Internet of Things, which together with advances in machine learning have ushered in the era of Artificial Intelligence. To date, CMOS technology advancement has been driven primarily by market demand for faster and more energy-efficient digital computing; as such, transistor scaling to sub-10 nm technology nodes has presented challenges for analog/RF IC design. In this keynote presentation she will discuss evolutionary advancements in CMOS technology that can address these challenges, focusing on relevant figures of merit, for revolutionary impact.

Immediately after the plenary session, the RFIC Reception and Symposium Showcase will follow, with highlights from our industry showcase and student paper finalists in an engaging social and technical evening event supported by the RFIC 2024 corporate sponsors. The showcase will provide authors the opportunity to

The showcase will provide authors the opportunity to give live demonstrations of their work in a lab-like environment for more close-up discussion and interaction.

give live demonstrations of their work in a lab-like environment for more close-up discussion and interaction (see Figure 2 for a photo of the RFIC 2023 showcase). You will not want to miss the RFIC 2024 reception!

On Monday and Tuesday, RFIC 2024 will have multiple tracks of oral technical paper sessions and will offer panel sessions during the lunch breaks. Monday’s lunchtime panel, titled “RF and Microwave League of Champions,” will see two teams, one from industry and one from academia, competing with each other to solve practical RF engineering problems. Who is better at combining knowledge, intuition, and creativity: industry or academia? The audience is invited to participate and support their favorite team. Tuesday’s lunchtime panel, organized jointly with the International Microwave Symposium (IMS) 2024, will discuss

the topic “AI in RFIC: Opportunities, Threats, and Limitations.” The use of AI has become one of the hottest and most controversial discussion topics of the moment. How will this pervasive technology transform our industry? This lunchtime panel, with both industry and academia experts, will explore the opportunities offered by AI as well as its limitations (if any!) and its potential threats.

Last but not never the least, RFIC 2024 and Microwave Week have many educational and professional development opportunities for students—all delivered at exceptional value. Following its introduction in 2022, we will have an event dedicated to young engineers, called *Student–Industry ChipChat*, for RFIC 2024, where students can meet, interact, and learn about exciting technology trends and their potential future careers from industry experts.

(continued on page 158)



Figure 3. Various attendees of our 2023 “Reviewers Recruiting and MTT-S Journals Reception” at IMS San Diego enjoying the evening.

some reviewing for one or more of our sponsored journals over the coming 12 months. You can sign up for a ticket by using the link at the end of the article. We will require some details on your areas of expertise, affiliation, and experience level to properly place you in our reviewing pools, so please respond to all the questions on the sign-up form. Once the form is submitted, you will receive an entry ticket via the e-mail address you provide. Please print this ticket or keep it handy on your

mobile phone to show at the door when you arrive at the reception. Places are limited, and we will close off the ticketing as soon as we have reached our room/reception quota.

Don’t miss this last chance to get acquainted with our publications, meet our editors, and hear about our publication philosophy and future directions. Get your questions answered and give your feedback—positive and negative—directly to those who handle your manuscripts or who are constantly asking for more and more of

your precious time to do reviews! We can’t wait to see you for the first time or to meet you again in Washington, DC, USA, as we capitalize across the spectrum on your continued support and interest!

If you have any questions or comments, do not hesitate to contact the organizers of this event at peter@thzglobal.com. The link to get a ticket for the 2024 IMS “MTT-S Journals Reception” is <https://mtt.org/ims2024-journal-event/>.



The 2024 RFIC Symposium *(continued from page 129)*

Furthermore, RFIC 2024 will once again conduct a contest to select the top student papers from the symposium. The top student papers will also be featured at our Sunday’s Symposium Showcase, providing an additional exposure opportunity. As part of IMS, students have the opportunity to participate in design competitions and an RF Boot Camp. Lastly, the IEEE Microwave Theory and Technology Society offers a Ph.D. Student Sponsorship Initiative for new students

to become engaged with Microwave Week, providing learning, networking, and volunteer experiences along with complimentary registration and accommodations to qualified and selected students. Students can purchase the Student Superpass, allowing them to experience every activity within Microwave Week, including a workshop, all three conferences (RFIC, IMS, and the Automatic RF Techniques Group Microwave Measurement Symposium), the Future Summit, a techni-

cal lecture, and much more—all at a deeply discounted price for IEEE Student Members.

On behalf of the RFIC 2024 Steering and Executive Committees, we extend a warm invitation for you to join us in Washington, DC. For more details and updates, please visit our website at <http://rfic-ieee.org/> and our LinkedIn page at <https://www.linkedin.com/company/ieee-radio-frequency-integrated-circuits-symposium/>.

