

***State Key Laboratory of  
Analog and Mixed-Signal VLSI (AMSV)  
Institute of Microelectronics (IME)***

University of Macau

**Newsletter**

(2025 Milestones)

Year 15  
No. 15



# ACADEMIC COMMITTEE

## The Third SKL Academic Committee 第三屆國家重點實驗室學術委員會

2023-2028



Prof. Ming LIU  
IEEE Fellow  
Fudan University \*1



Prof. Franco MALOBERTI  
IEEE Life Fellow  
University of Pavia



Prof. Zhihua WANG  
IEEE Fellow  
Tsinghua University



Prof. Howard Cam LUONG  
IEEE Fellow  
Hong Kong University of  
Science and Technology



Prof. Rui MARTINS  
IEEE Life Fellow  
University of Macau\*2



Dr. Seng-Pan U  
IEEE Fellow  
Macao Institute of  
Industrial Technology



Prof. Massimo ALIOTTO  
IEEE Fellow  
National University of  
Singapore



Prof. Chi-Hou CHAN  
IEEE Fellow  
City University of Hong Kong



Prof. Michael KRAFT  
Katholieke Universiteit Leuven



Prof. Qiang LI  
Hamburg University  
of Technology



Prof. Yu WANG  
IEEE Fellow  
Tsinghua University



Prof. Nanjian WU  
Chinese Academy of Sciences



Prof. Shouyi YIN  
IEEE Fellow  
Tsinghua University

13 eminent IC experts (10 IEEE Fellows) 13名傑出的IC專家 (10名IEEE會士)

2 Academicians (1 China, 1 Portugal) 2名院士 (中國1, 葡萄牙1)

\*1: Academician of Chinese Academy of Sciences 中國科學院院士

\*2: Academician of the Academy of Sciences of Lisbon, Portugal 葡萄牙科學院院士

# ORGANIZATIONAL CHART

## Academic Team 學術團隊

### Management 管理



**Prof. Rui MARTINS**  
馬許願教授  
IEEE Life Fellow IEEE終身會士  
Director of IME  
微電子研究院院長  
Founding Director of SKL-AMSV (2011-2022)  
全國重點實驗室主任(2011-2022)



**Prof. Pui In MAK**  
麥沛然教授  
IEEE Fellow IEEE會士  
Director of SKL-AMSV  
全國重點實驗室主任  
Deputy Director (Research) of IME  
微電子研究院副院長(研究)



**Prof. Ming LIU**  
劉明教授  
Chair of SKL Academic Committee  
(Scientific Advisory Board)  
實驗室學術委員會主席



**Prof. Man Kay LAW**  
羅文基教授  
Laboratory Infrastructure Coordinator  
實驗室基礎設施協調主任



**Prof. Yan ZHU**  
諸嫣副教授  
Industrial Collaboration Coordinator  
產業合作協調主任



**Prof. Chi Hang CHAN**  
陳知行副教授  
Coordinator of Microelectronics GBA Branches  
微電子大灣區分部主任

## Faculty Members 教學人員



**Pui In MAK**  
麥沛然  
Chair Professor  
講座教授



**Sai Weng SIN**  
冼世榮  
Full Professor  
教授



**Man Kay LAW**  
羅文基  
Full Professor  
教授



**Yan ZHU**  
諸嫣  
Associate Professor  
副教授



**Chi Hang CHAN**  
陳知行  
Associate Professor  
副教授



**Chi-Seng LAM**  
林智聰  
Full Professor  
教授



**Sio Hang PUN**  
潘少恒  
Associate Professor  
副教授



**Jun YIN**  
殷俊  
Associate Professor  
副教授



**Yanwei JIA**  
賈艷偉  
Associate Professor  
副教授



**Ka-Fai UN**  
阮家輝  
Associate Professor  
副教授



**Mo HUANG**  
黃沫  
Associate Professor  
副教授



**Ka-Meng LEI**  
李家明  
Associate Professor  
副教授



**Cheng HUANG**  
黃丞  
Associate Professor  
副教授



**Minglei ZHANG**  
張明嘉  
Assistant Professor  
助理教授



**Yang JIANG**  
江洋  
Assistant Professor  
助理教授



**Wei-Han YU**  
于維翰  
Assistant Professor  
助理教授



**Mingqiang GUO**  
郭銘強  
Assistant Professor  
助理教授



**Yatao PENG**  
彭亞濤  
Assistant Professor  
助理教授



**Yuan WANG**  
王苑  
Assistant Professor  
助理教授



**Ren SHEN**  
沈韌  
Assistant Professor  
助理教授



**Jiewei XU**  
徐佳唯  
Assistant Professor  
助理教授



**Zhiyuan YAN**  
閻智源  
Assistant Professor  
助理教授



**Haijun SHAO**  
邵海軍  
Assistant Professor  
助理教授



**Wenliang ZENG**  
曾文良  
Assistant Professor  
助理教授



**Jiangchao WU**  
吳江潮  
Research Assistant Professor  
研究助理教授



**Io Wa IAM**  
任耀華  
Research Assistant Professor  
研究助理教授



**Chi Wa U**  
余志偉  
UM Macao Fellow  
澳大濠江學者

## Administrative and Technical Team 行政技術團隊



**Fan NG, Leo**  
吳凡  
Functional Head  
(Operation)  
事務主管(運行)



**Un Pang LEI, Lewis**  
李遠鵬  
Functional Head  
(Technical)  
事務主管(技術)



**Bin ZHOU, Jet**  
周斌  
Technology Transfer  
Officer  
技術轉移主任



**Chi Wai TANG, Kevin**  
鄧志偉  
Laboratory Technician-Safety  
Officer  
實驗室技術員-安全主任



**Yuen Ki CHAN, Elizabeth**  
陳婉琪  
Administrative Officer  
行政主任



**Jie GAO, Jennie**  
高潔  
Laboratory Technician-Safety  
Officer  
實驗室技術員-安全主任



**Jianyu ZHONG, Jankey**  
鍾健瑜  
Laboratory Technician  
實驗室技術員



**Li MENG, Lucas**  
孟李  
Laboratory Technician  
實驗室技術員



**Pui Wan SOU, Jenny**  
蘇佩雲  
Senior Administrative  
Assistant  
高級行政助理



**Sut Wai IEONG, Hedy**  
楊雪慧  
Senior Administrative  
Assistant  
高級行政助理



**Weng Ian CHONG, Surena**  
鍾詠恩  
Administrative Assistant  
行政助理



**Ian Kei PUN, Niki**  
潘欣琪  
Administrative Assistant  
行政助理

## New Academic Joined SKL AMS-VLSI in 2025



**Assistant Professor**

Wenliang ZENG received his Ph.D. degree in Electrical and Computer Engineering from UM. He was Macao Fellow at the SKL-AMSV/IME, and joined the Institute of Microelectronics, UM, as an Assistant Professor in Oct 2025.

**Research Interests:** Power Management Integrated Circuits, Power Architecture Modelling, Power Magnetics.



**Associate Professor**

Cheng HUANG received his Ph.D. degree in Electronic & Computer Engineering from Hong Kong University of Science and Technology. He was a full-time staff scientist in Broadcom Limited in San Jose, and associate professor in Iowa State University, USA. He joined the Institute of Microelectronics, UM, as an Associate Professor in Dec 2025.

**Research Interests:** Wireless Power Transfer Systems, Switching Power Regulators, Energy Harvesting Systems, PA Supply Modulators, LED Drivers, Charge Pumps and High Performance Linear Regulators.

# INTRODUCTION

The laboratory was established by the University of Macau to conduct cutting-edge research on state-of-the-art electronics and other related emerging fields with research emphasis in analog and mixed-signal circuits specially focusing in wireless/wireline RF transceivers and data converters for high-speed and low-power applications. The laboratory also actively develops research in power management circuits and microfluidic chips, developing solutions for Lab-on-Chip and eventually Lab-on-CMOS applications.



President Xi Jinping visits the University of Macau and knows about the research development of SKL-AMSV, 2014

The core research team of the laboratory (SKL-AMSV) is mainly composed (50%) by Macao talents born and trained at all levels up to the PhD in the University of Macau. In 2025, it has attracted 2 chair professors, 3 full professors, 9 associate professors, 11 assistant professors, 1 UM Macao fellow and 2 Research Assistant Professors, among them 2 are Academicians of the Academy Sciences of Lisbon, Portugal, 2 are IEEE Fellows (USA) and 1 is RSC & IET Fellow.



Prof. Mak Pui-In awarded medal of merit by Macao SAR Government, 2024



Prof. Rui Martins receives Chinese Government's Friendship Award, 2025

There are also over 35 post-docs and around 500 doctoral and master students. The dominant expertise of the lab in state-of-the-art electronics reached world-top standards in the field. The testing equipment is also advanced and quite unique in the Greater Bay Area. As of 2025, the laboratory published 18 books and chapters, 785 international refereed journal articles and 458 international conference papers, 88 of which were published in the most prestigious electronics conference in the world – the International Solid-State Circuits Conference (ISSCC), that takes place every year in San Francisco, USA. The research team presented 15 papers at ISSCC 2023 with chip measurements, ranking first in the world in terms of number of publications. They also presented 14 papers at ISSCC 2024 and ISSCC 2025, ranked first in the world in ISSCC 2024 together with Samsung and the Korea Advanced Institute of Science and Technology (KAIST). In ISSCC 2025, the team ranked second, just behind Peking University.



A group photo of the research team at ISSCC 2025

Furthermore, during the same period the lab had 74 patents, 33 Chinese patents, 3 Taiwan Region patents and 38 US patents. Several works from the lab are already in practical use in a wide range of electronic equipment, achieving technology transfer. In addition, the lab's research team won the second prize of the 2011 National Science and Technology Progress Award, for the first time attributed to a team from Macao, and numerous FDCT awards in particular the 1st prize in Technological Invention also attributed for the first time in Macao in 2020.

Prof. Rui Martins, Founding Director (2011-2022) of the SKL-AMSV, received a Medal of Merit – Education from Macao SAR Government in 2022, in recognition of his outstanding contribution to education. More recently, Prof. Rui Martins has been honoured with a national award in electrical engineering by the Ordem dos Engenheiros of Portugal in 2024, and received a Chinese Government's Friendship Award in 2025. Moreover, Prof. Mak Pui-In, Director of the SKL-AMSV, was the first and only scholar from Macao to receive the Xplorer Prize in 2022. He was also awarded the Medal of Merit – Education from Macao SAR Government in 2024. Besides, the lab's research team won the 2010 Ho Leung Ho Lee Science and Technology Innovation Award, 6 medals from the Central and Macao SAR governments, and 1 of its members was elevated to the Chinese Academy of Sciences as a Foreign Expert.

# INTRODUCTION

✓ Benchmark with top national academic institutions in terms of *state-of-the-art chips* in **IEEE ISSCC**, San Francisco, USA

按前沿芯片成果於國際固態電路會議與我國頂級學術機構的比較



國內學術機構	2011-2015	2016-2020	2021	2022	2023	2024	2025	2026	論文總數
University of Macau 澳門大學 ★	9	30	2	4	15	14	14	11	99
Tsinghua University 清華大學	3	8	6	8	14	13	13	18	83
Peking University 北京大學		2	4	5	6	5	15	6	43
Fudan University 復旦大學	5	6		3	3	3	7	10	37
HKUST 香港科技大學	11	11		1			2	3	28
Chengdu UESTC 電子科技大學		4	3	1	5	4	5	3	25
Southeast University 東南大學		2	1		3	6	4	6	22
Univ. of S&T of China 中國科學技術大學			1	2	1	5	4	6	19
Chinese Acad. Sci. 中國科學院	3		1		4	3	2	5	18
Zhejiang University 浙江大學			2	3	3	2	3	2	15
Southern Univ. of S&T 南方科學大學						5	3		13
Shanghai Jiaotong U. 上海交通大學		2			1	1	3		7
Xidian University 西安電子科技大學							5	2	7
Xi'an Jiaotong U. 西安交通大學		1				1	3	1	6
HCUHK (Shenzhen) 香港中文大學 (深圳)						2	1	1	4
East China Normal Univ. 華東師範大學						1	1	2	4
Tianjin University 天津大學		1		1			1		3
Sun Yat-sen University 中山大學						1		2	3
Nanjing University 南京大學							1	2	3
CityU HK 香港城市大學					1			1	2
National Key Lab of Solid-State Microwave Devices and Circuits 固態微波器件與電路全國重點實驗室							1	1	2
HKUST (Guangzhou) 香港科技大學 (廣州)								2	2
Beijing Institute of Tech. 北京理工大學						1			1
Tongji University 同濟大學						1			1
South China U of Technology (SCUT) 華南理工大學							1		1
Nanjing U. of S & T 南京理工大學							1		1
National U. of Defense Tech. 國防科技大學							1		1
Westlake University 西湖大學								1	1
Huawei Technologies 華為科技有限公司								1	1
Beihang University 北京航空航天大學								1	1
Shenzhen University 深圳大學								1	1
Huazhong University of Science and Technology 華中科技大學								1	1
Hangzhou Dianzi University 杭州電子科技大學								1	1
Sanechips Technology 中興微電子								1	1

## Awards 嘉獎

2 x Far-East Best Paper Award

遠東傑出論文獎

(1st in China 中國首獲)

14 x SSCS Pre-Doctoral Achievement Award

博士生成就獎

2 x ISSCC Silkroad Award

絲綢之路獎

1 x ISSCC Student Research Preview Award

學生研究海報獎

21 x ISSCC Student Research Preview

學生研究海報

Sixteen consecutive years (2011-2026) in ISSCC with 99 papers! 連續16年於國際固態電路會議發表了99篇論文!

## Rank 排名

2026

Paper 論文數量

1	Tsinghua University	清華大學	18
2	Delft University of Technology	代爾夫特理工大學	13
3	KAIST	韓國科學技術院	13
4	Samsung Electronics *	三星電子	12
5	University of Macau	澳門大學 ★	11

## Rank 排名

2025

Paper 論文數量

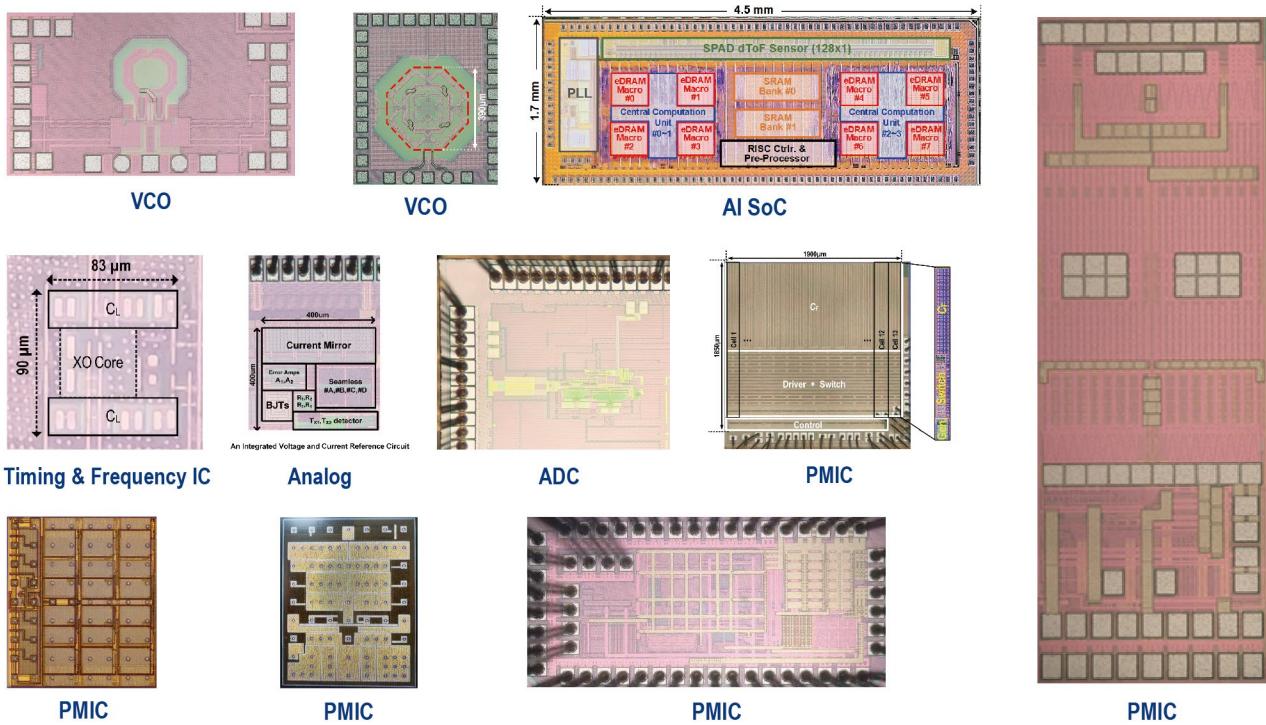
1	Peking University	北京大學	15
2	University of Macau ★	澳門大學	14
3	Tsinghua University	清華大學	13
4	KAIST	南韓科學技術院	12
5	SAMSUNG *	三星	11

\* Multi-countries in Worldwide 包括世界多個國家

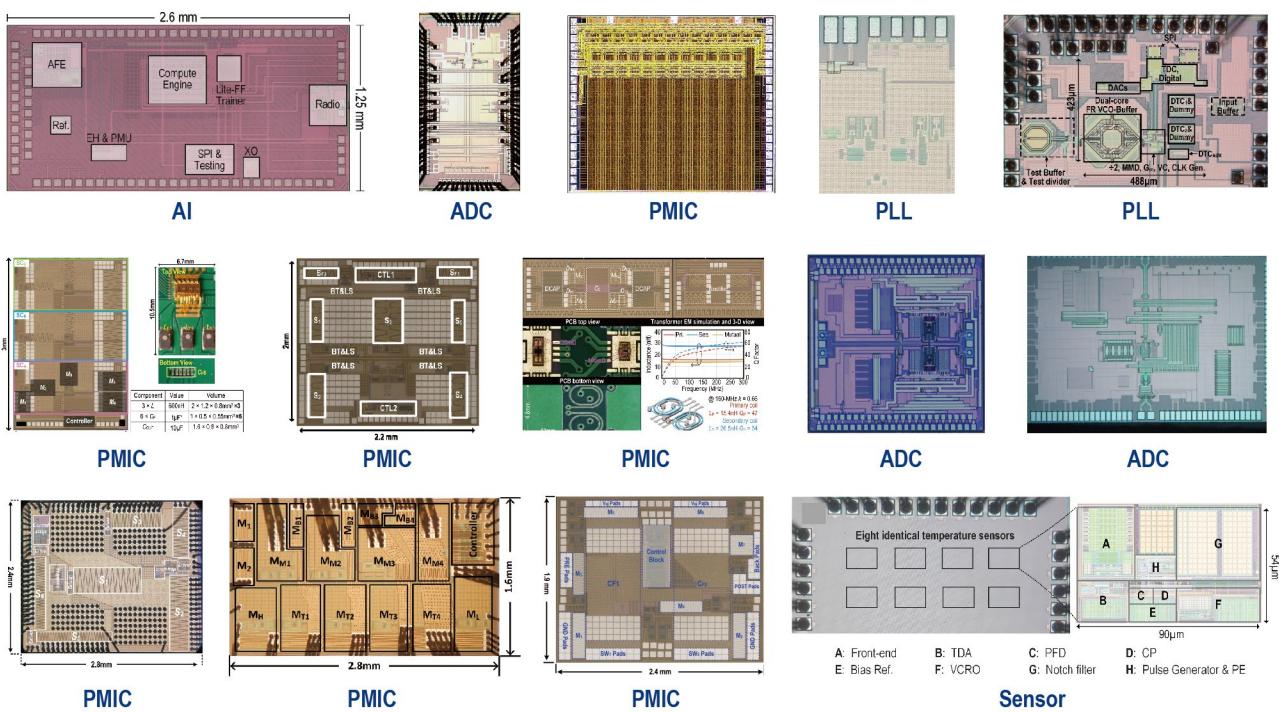
World Organization Ranking 世界機構排名 • 2024 & 2023 : 1<sup>st</sup>

# INTRODUCTION

## Chips presented in ISSCC 2026



## Chips presented in ISSCC 2025



# THREE REGIONS UNITED, SHAPING THE 'CORE' FUTURE

The Laboratory (SKL-AMSV) established its branches in Hengqin, Zhuhai and Futian, Shenzhen in 2019 and 2023 respectively — the Microelectronics Research Center at Zhuhai UM Science & Technology Research Institute (ZUMRI) and University of Macau (UM) Hetao Integrated Circuits Research Institute (UMHIC). With the laboratory (SKL-AMSV) as the technical main body and the development of scientific and technological innovation as the leading force, a microelectronics industrial chain featuring chip design, testing and inspection will be constructed in these two institutes, undertaking the research and transfer and transformation of cutting-edge technologies in the field of microelectronics of the UM in the Chinese mainland.

## The Microelectronics Research Center (MRC) at Zhuhai UM S&T Research Institute (ZUMRI)

In response to the Development Plan Outlines for the Guangdong-Hong Kong-Macao Greater Bay Area, the Microelectronics Research Center (MRC) at Zhuhai UM S&T Research Institute (ZUMRI) was established in 2019, aiming at demonstrating a successful example of research technology commercialization in Zhuhai Hengqin, connecting Macao with the other cities in the Greater Bay Area. The Microelectronics Research Center operates as a Hengqin Branch of the State Key Laboratory of Analog and Mixed-Signal VLSI of the University of Macau (UM), providing one more platform and opportunity for UM microelectronics professors to conduct applied research and development. Also, Hengqin has a much larger area compared to Macao, attracting UM graduates to stay and helping UM professors to expand their research groups. With such, the Institute of Microelectronics at UM greatly boosts the number of graduate students, nurturing more skilled and talented engineers not only for Macao and Hengqin, but also for the whole IC industry of China.



The Microelectronics Research Center (MRC) at Zhuhai UM S&T Research Institute (ZUMRI)

## 1. Integrated Circuits Talent Training Center of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin

In May 2023, ZUMRI successfully passed the evaluation by the Economic Development Bureau of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin and was approved to establish the first Integrated Circuits Talent Training Center in the zone. The training center is set up under the Microelectronics Research Centre of ZUMRI. It is dedicated to cultivating outstanding scientific and technological innovation talents in the field of integrated circuits, and jointly promoting the high-quality development of the integrated circuits industry ecosystem.

Currently, the training center is equipped with corresponding teaching software and multimedia teaching facilities, enabling practical course instruction related to integrated circuits. It also features testing laboratories for integrated circuits, as well as intelligent manufacturing design and verification, which can provide testing services for enterprises in areas such as power management, RF, and mixed-signal chips and their peripheral circuits. Oriented towards meeting the talent needs of enterprises, the center can customize exclusive training courses for companies, helping to facilitate talent exchange and development between educational institutions and enterprises.



Plaque of the first Integrated Circuits Talent Training Base of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin



Talent training situation

## 2. The Microelectronics Research and Development Center of University of Macau Advanced Institute in the Guangdong-Macao In-Depth Cooperation Zone in Hengqin

In December 2023, based on ZUMRI, the second phase of the industry-university-research (IUR) base was established in the Greater Bay Area - the Microelectronics R&D Center (MRC) of University of Macau Advanced Institute in the Guangdong-Macao In-Depth Cooperation Zone in Hengqin. MRC was relocated to Yuxin Building, marking a new stage in the development. MRC will further enhance the capacity on technology transfer, enhance public service performance and contribute to the construction of a distinctive microelectronics industry chain for chip design, testing and inspection in Guangdong-Macao In-Depth Cooperation Zone in Hengqin. The current projects MRC is undertaking mainly include professional fields such as wireless communication, analog-to-digital converters, power management, high-speed communication interfaces and microfluidic bio-detection in chip design. Meanwhile, MRC is also the executive unit of the Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing.

## 3. The Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing

The Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing (Guangdong-Macao Joint Laboratory) was approved for establishment by Department of Science and Technology of Guangdong Province and The Macao Science and Technology Development Fund (FDCT) in 2024. Guangdong-Macao Joint Laboratory is led by the UM, relying on the Institute of Microelectronics, UM, and jointly established with Sun Yat-sen University, the Hong Kong University of Science and Technology (Guangzhou), and the University of Macau Advanced Institute in the Guangdong-Macao In-Depth Cooperation Zone in Hengqin.

The main task of Guangdong-Macao Joint Laboratory is to develop and research modular chip design and testing technologies with application value to meet the increasingly complex and diverse demands of modern emerging systems. The Guangdong-Macao Joint Laboratory will forge ahead with determination, fully leverage the resource advantages of both regions and actively serve the upgrading and development of the chip industry in Guangdong and Macao. By deepening IUR collaboration, the Guangdong-Macao Joint Laboratory will promote the coordinated development of the chip industry in Guangdong and Macao, accelerate the application and implementation of project achievements in the Greater Bay Area, and help build a competitive industrial chip highland.



Plaque of the Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing

## 4. State Key Laboratory of Analog and Mixed-Signal VLSI Industrial Group (AMSV-IG)

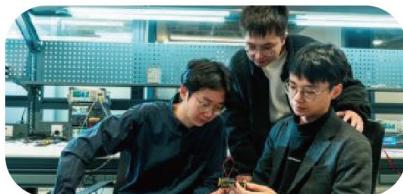
From its very inception, the vision for the laboratory (SKL-AMSV) was to carry out its mission in close partnership with the industry that employs its graduates and brings the fruits of its research to the world. Through the State Key Laboratory of Analog and Mixed-Signal VLSI Industrial Group (AMSV-IG), AMSV benefits from financial support as well as the unique advice and mentorship on critical research directions and relevant problems that only industry can provide. Also through the AMSV-IG, industry partners gain preferential and early access to AMSV's research, educational programs and start-ups and in this way connect with and shape cutting-edge research on topics of strategic relevance to their future.



State Key Laboratory of Analog and Mixed-Signal VLSI Industrial Group Forums from 2023 to 2025

## University of Macau (UM) Hetao Integrated Circuits Research Institute (UMHIC)

University of Macau (UM) Hetao Integrated Circuits Research Institute (UMHIC) established under the leadership of Professor Mak Pui In and his team, is UM's first strategic scientific research platform in Shenzhen. It was established in 2023 within the Shenzhen Park of the Hetao Shenzhen-Hong Kong Science and Technology Innovation Cooperation Zone. UMHIC deeply integrates the research advantages of the laboratory (SKL-AMSV), bringing together a team of internationally top-tier scientists. It focuses on three major technical areas: wired/wireless communication, power management, and data conversion & signal processing. UMHIC conducts innovative research to tackle critical technical challenges in the industry, aiming to build the "Core" engine for integrated circuits in the Greater Bay Area.



Office and testing environment of UMHIC

### • Strategic Objectives

#### Pioneering Frontier Innovation

Taking international leadership as the benchmark, deeply engaging in fields such as high-performance power management, breaking through key technologies, and empowering frontier industries.

#### Integrating "R&D + Transformation"

Promoting the transformation of scientific research achievements, building a cooperative ecosystem with leading enterprises; establishing a technology transfer center, commercializing achievements, and opening up the entire chain from innovation to industry.

#### Dual Drivers: R&D Carriers & Layout

Advancing the qualification application for R&D institutions, improving the innovation carrier system; focusing on core areas to conduct basic research, enhancing the innovation level and service capabilities, and injecting vitality into the industry.

### • Industrial Cooperative Ecosystem

By partnering with leading enterprises, UMHIC focuses its R&D on power management, analog circuits, and data converter technology. This collaboration fosters shared expertise to tackle design challenges more efficiently and connects technology transformation with real-world applications to ensure successful commercialization.



Partnering with leading enterprises to tackle core technology challenges

### • Academic Cooperation Network

UMHIC deeply integrates diverse domestic and international academic cooperation networks. To date, it has carried out cooperation with over 10 top universities and research institutes, injecting strong momentum into technological breakthroughs and industrial development.

We team up with leading domestic academic institutions such as Tsinghua University, University of Electronic Science and Technology of China, and the Institute of Microelectronics of the Chinese Academy of Sciences. During critical technology development phases, we bridge the gap from theoretical research to technical verification, providing professional support for iteration. Concurrently, we expand our global reach by connecting with internationally renowned universities like the Hong Kong University of Science and Technology, the University of Tokyo, and Universiti Malaya, fostering a rich exchange of ideas across different cultural contexts.

# THREE REGIONS UNITED, SHAPING THE 'CORE' FUTURE



Partnering with 10+ top universities & institutes to advance innovation and talent development

## • Event Exchange and Collaborative Engagement

With the focuses on innovation of core technology, advancement of cross-domain industrial collaboration and fosterage of the alignment of scientific research with industrial demand, UMHIC has built a diversified event framework.



Mini Power IC Design Workshop



"Chip Innovation" Distinguished Lecture Series



the Youth Chip Innovation Forum

## Cooperation Model

### • Governmental project:

- Joint-Platform:** Relying on the policy advantages of the cooperation zone, jointly build an advanced testing technology and service platform with the integrated circuits enterprises in the cooperation zone
- Project Application:** Jointly apply with enterprises for the core and key technology research and development projects
- Fund Application:** Jointly apply with enterprises for government joint research funds, including:
  - Macao Science and Technology Development Fund - Guangdong Provincial Department of Science and Technology Jointly Funded Projects
  - Macao Science and Technology Development Fund - Ministry of Science and Technology of the People's Republic of China Jointly Funded Projects



### • Industrial projects:

We provide services for various enterprises, including technical consultation, commissioned development, and customized talent training courses. We are committed to helping enterprises overcome technical and management challenges in the production process, promoting technological upgrading and product improvement, and enhancing the professional capabilities and research levels of talents.



### • Joint laboratory:

A non - physical research platform jointly is built by enterprises and research institutes, leveraging their respective strengths and characteristics, aiming to accelerate the commercialization of scientific research results. The joint laboratory includes functions such as commissioned development and personnel training. It has research directions consistent with the construction plan of the research institute, supporting organizational management systems, and stable funding guarantees for operation. It is a comprehensive and in-depth form of cooperation.



# INDUSTRIAL COLLABORATION

## R&D of Robotic Simultaneous Localization and Mapping – MaNSoC

At the WESEMiBAY Semiconductor Ecosystem Expo 2025, the State Key Laboratory of Analog and Mixed-Signal VLSI (SKL-AMSV) of the University of Macau (UM) showcased its flagship project, MaNSoC, along with significant achievements in technology transfer and industrialization.

As part of the National Key R&D Program of China, MaNSoC focuses on advanced technologies for robotic perception and control. The project is led by Prof. Sai-Weng SIN and Prof. Mingqiang GUO of SKL-AMSV. A key innovation is the low-power Analog-to-Digital Converter (ADC), integrated into robotic controller SoCs. Our team has also commercialized its low-power ADC and DC-DC converter technologies, bridging research and real-world applications.



To accelerate industrialization and promote Hengqin-Macao collaboration, we partnered with Amicro Semiconductor Co., Ltd. to establish two joint laboratories in 2023. In December 2024, the UM Science and Technology Research Institute (ZUMRI) signed a Memorandum of Understanding (MoU) with Amicro Technology (Macau) to advance robotics technologies under the model of “Research in Macao, Commercialize in Hengqin”. We also received funding support through the Macau Key R&D Project in 2024, and in 2025 secured two additional programs — the FDCT-GDST funded program and the Hengqin Guangdong-Macao In-Depth Cooperation Key Technology Research Program — both of which are ongoing, driving deeper integration of research and industrialization.

Currently, MaNSoC technologies power the laser radar obstacle avoidance chip in the Xiaomi M30 Robot Vacuum, and are adaptable to window-cleaning robots and companion robots, laying a solid foundation for future robotics innovation.



Xiaomi M30 Robot Vacuum and Internal Chip Display

# SPIN-OFF COMPANIES

## Smarmac Technology Ltd.

Smarmac Technology Ltd. was registered in Macao in 2021, aims to promote and gradually achieve the industrialization of wireless charging technology, power quality compensation devices, and other self-developed power electronic technologies.

Our main business focuses on wireless charging products and solutions for low-power mobile devices and medium-power electric devices. The technology, independently developed by a spin-off company, Smarmac Technology Ltd. from SKL-AMSV & IME, UM, has led to the creation of the All-in-One Power Station. This innovative solution can simultaneously charge 3+1 different electronic devices, offering users greater flexibility in device placement and effectively meeting their multi-device charging needs, thereby enhancing their mobile experience. The technology can charge Qi-standard compatible phones, earphones, and other products, and is equipped with features such as smart standby and foreign object detection. Additionally, we are developing various wireless charging technologies for commercial intelligent mobile devices, drones and personal electric vehicles. Potential application scenarios include offices, hotels, parking lots, and other public places, providing a new and convenient charging experience for travelers and citizens, and contributing to the creation of a smart tourism city.

For the intelligent current optimization device, our company has two models, including Standard Model and Distributed Model. Our company has collaborated with The Macao Water Supply Company Limited and University of Macau to install an industrialized intelligent current optimization device. These installations have successfully reduced the reactive power bills of the water plant and alleviated the harmonic current pollution in the exhaust system of research building. This year, our device is set to expand beyond Macao with its first installation in a shopping mall in Hong Kong, where it will be applied to the central air-conditioning system to deliver substantial electricity cost savings for the client.

Our company will continuously promote green and sustainable development in Macao by offering various power electronics solutions. We are committed to enhancing the research and development capabilities of local young scientists and technologists, and contributing to the moderate diversification of Macao's economy.

**All-in-One Power Station**  
Model: T292

- 5 Device Quick Charge At Once
- USB-A/BC 18W & Wireless total 30W Output
- High-Class Fabric & Anti-Scratch Fabric Cover

**Power Delivery Specifications**  
Input: 100V~240V AC, Max Output: 5V/3A 12V/3A 15W+5W  
USB-C Output : 5V/3A 19V/2A 12V/1.5A  
USB-A Output : 5V/3A 19V/2A 12V/1.5A  
USB-A+USB-C Output: Total 5V~4A Side USB-C Output 5V~4A

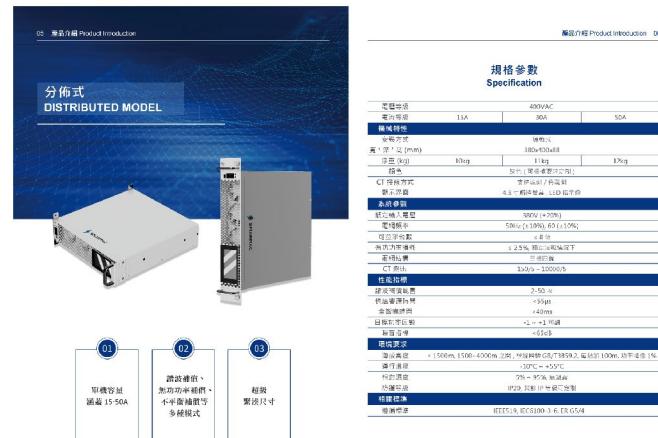
FCC ID : 2BNQB-T292



All-in-One Power Station for low-power mobile devices



Introduction of intelligent current optimization devices



Intelligent current optimization devices (Standard Model and Distributed Model) and their specifications

# SPIN-OFF COMPANIES

## Zhuhai ProMed Technology co., Ltd.

Zhuhai ProMedicine Technology Co., Ltd. is a technology-driven company incubated by the AMSV State Key Laboratory and based in Hengqin. Guided by the philosophy of "treating the same disease differently with precision medicine".

The company focuses on independent research and development of cancer drug susceptibility testing, antibiotic drug screening, and digital PCR diagnostic equipment. Professor Jia Yanwei serves as the Chief Scientific Advisor, while Dr. Hui Wenhao oversees company operations. The technical team comprises a highly experienced group of postdoctoral and PhD researchers with expertise in electronics, mechanical engineering, biology, and chemistry.

The ProMedicine team has published 11 papers and authorized 13 patents, won the Championship and the Best Display Award at the 2024 University of Macau Bank of China Cup Extreme Innovators Entrepreneurship Competition. The product has been promoted and used in hospitals and cancer research centers in the United States, the United Kingdom, and China. The team will continue to drive the development of precision medicine and explore international collaborations to provide precise, personalized medical solutions for patients worldwide.



## Digifluidic Biotech Ltd. <http://digifluidic.com>

Digifluidic owns the first domestically successful mass-produced EWOD-based nucleic acid testing POCT platform, the Virus Hunter Plus fully automatic nucleic acid analyzer, and a series of digital microfluidic detection chips. By integrating the most mature magnetic bead-based nucleic acid extraction and fluorescent quantitative PCR testing technologies in the nucleic acid testing industry into the chips, combined with electrowetting digital microfluidic technology, Digifluidic has achieved a portable, efficient, precise, automated, and low-cost in vitro diagnostic solution. The company's core technology originates from the State Key Laboratory of the University of Macau, with the R&D team having deep expertise in applying digital microfluidic technology to molecular biology for many years. Macau Digifluidic Biotechnology Co., Ltd. was awarded the certification for "Potential Technology Enterprise" in 2023 under the "Technology Enterprise Certification Program" launched by the Economic and Technological Development Bureau. Digifluidic holds over 40 intellectual property rights, including more than 10 invention patents. The company has published multiple research papers, with one titled "A digital microfluidic platform coupled with colorimetric loop-mediated isothermal amplification for on-site visual diagnosis of multiple diseases" featured in the internationally renowned journal Lab on a Chip.

Virus Hunter Plus is a portable nucleic acid analyzer that utilizes digital microfluidic DNA chips to simplify microbial testing. Equipped with pre-installed programs and a high degree of automation, it enhances diagnostic efficiency. It requires no specialized personnel and is easy to operate. Serving as an alternative to traditional PCR laboratories, it meets on-site point-of-care testing (POCT) needs and enables rapid detection. Currently, it is primarily applied in fields such as Healthcare: in vitro diagnostics/genetic analysis; Agriculture: disease detection/genetic analysis; Pet Care: pet health examinations; Food Safety: authenticity verification/adulteration identification/pathogen detection. Additionally, customized digital microfluidic products can be developed based on diverse customer requirements.



## Universities World-Wide



## Companies in Greater Bay Area



## 全球學術機構



## and beyond 大灣區工業界



Geehy 极海半导体  
SEMICONDUCTOR



AMICRO  
一微半导体



INBISEN  
英彼森半导体



纽瑞芯科技  
NEWRADIOTECH



ByteDance  
字节跳动

## Master of Science in Microelectronics

理學碩士學位 (微電子學) 課程

## Master of Philosophy in Microelectronics

哲學碩士學位 (微電子學) 課程

- 澳門大學提供兩個微電子學碩士課程

理學碩士學位 (微電子學) 課程: 適用於培養業界工程師人才

哲學碩士學位 (微電子學) 課程: 研究型人才

- 華南地區唯一的微電子全國重點實驗室, 在IEEE國際固態電路會議 (ISSCC) 上發表了大量論文

- UM offers two Master Programmes in Microelectronics:

- Master of Science in Microelectronics: to train talents and advanced engineers

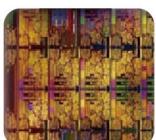
- Master of Philosophy in Microelectronics: for research talents

- The only State Key Laboratory of Microelectronics in South China, published a high number of publications in the world - renowned flagship conference - the International Solid - State Circuits Conference (ISSCC)

### 所提供的課程 Courses Offered



模擬集成電路  
Analog IC Design



數字集成電路  
Digital IC Design



無線/有線  
Wireless/Wireline



模數/數模轉換  
Data Converters



電源管理  
Power Management



生物科技  
Biomedical



人工智能  
Machine Learning



傳感器/物聯網  
Sensors/IoT Interfaces

### 學生人數 Student Figures

學年 Academic Year	註冊學校人數 Admission	畢業學生人數 Graduation
2021/2022	28	--
2022/2023	59	9
2023/2024	57	58
2024/2025	106	48
2025/2026	102	--

Bachelor of Science in Microelectronics approved by the Senate of UM in 14 Jan 2026. To start in UM's Campus in the Guangdong-Macao In-Depth Cooperation Zone in August 2027.



<https://ime.um.edu.mo/zh-hant/programme-educational-objectives/>

# EVENTS AND VISITS



The State Key Laboratory of Analog and Mixed-Signal VLSI (SKL-AMSV) is presented with the plaque



The Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing is presented with the plaque



UM Vice Rector Rui Martins receives Chinese Government's Friendship Award



UM SKL-AMSV held the 2nd meeting of its third Academic Committee



the 8th IEEE International Conference on Integrated Circuits, Technologies and Applications (ICTA 2025) was successfully held in Macao from 22 to 24 October 2025, with support from SKL-AMSV



Visit of Prof. José Epifânio Da Franca, plenary speaker of ICTA 2025, IEEE Fellow and professor at the University of Lisbon



UM Microelectronics Research Shines Again on the ISSCC 2025, with 14 papers from UM accepted

# EVENTS AND VISITS



Visit of the Delegation from Ministry of Science and Technology of the People's Republic of China



Visit of the Delegation from China Association for Science and Technology



Visit of Mr. Hou-Fai Sam, Chief Executive of Macao SAR



Visit of Ms. Lam O, from Secretary for Social Affairs and Culture of Macao SAR



Visit of the members from Macau Science and Technology Development Fund (FDCT)



Visit of Mr. Yin Hejun, Minister of Science and Technology



Event of the 1st Expert Committee Meeting of the Guangdong-Macao Joint Laboratory for Modular Chip Design and Testing and the 5th State Key Laboratory of Analog and Mixed-Signal VLSI Industrial Group Forum



Event of Master Programme Orientation of Institute of Microelectronics (IME)

# EVENTS AND VISITS



Visit of Mr. Patrick Huen, Chairman of the Board of Trustees and Board of Directors



Visit of Prof. Rodrigo Martins and Prof. Elvira Fortunato from the European Academy of Sciences



Visit of the Delegation from Beihang University



Visit of the students from Instituto Salesiano



Visit of the Delegation from Shenzhen-Macau Cooperation Working Group to UMHIC in Shenzhen



Visit of Dra. Elisa Ferreira, former European Union Commissioner and former Portuguese Minister

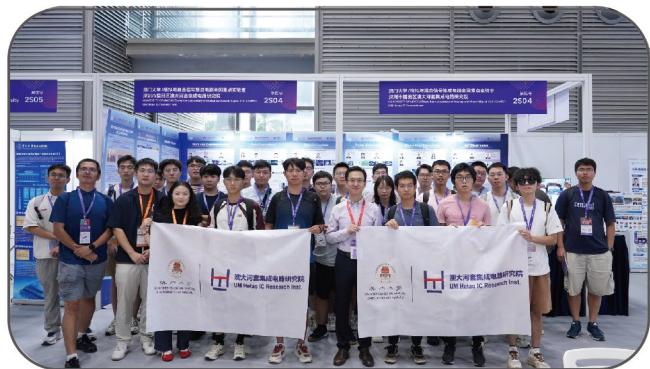


Visit of the Delegation from Chinese Academy of Sciences



Event of 1st Session of the 2025 Hengqin Integrated Circuits Engineer Employment Training Class held by Integrated Circuits Talent Training Center of the Guangdong-Macao In-Depth Cooperation Zone in Hengqin

# EVENTS AND VISITS



Event of 2nd Wesemibay Semiconductor Ecosystem EXPO 2025 in Shenzhen



Visit of the Delegation from National Natural Science Foundation of China



Visit of Ms. Xi Yanchun, Vice President from Xinhua News Agency



Visit of the members from judicial authorities and universities of Tocantins State, Brazil



Visit of the Delegation from University of Electronic Science and Technology of China



Visit of Prof. Joe Chicharo OM, Deputy Vice-Chancellor from University of Wollongong



Event of AMSV Academic Alumni 2025 Annual Meeting held by UMHIC in Shenzhen



Worshops on UM Hetao "chip Innovation" Distinguished Lecture Series held by UMHIC in Shenzhen

# STATE KEY LAB OF AMSV PUBLICATIONS IN 2025

## SCI Journals - 74 papers

### IEEE Journal of Solid-State Circuits

- "High-Efficiency Ultrasound Energy Harvesting Interface with Auto-Calibrated Timing Control From  $-25^{\circ}\text{C}$  to  $85^{\circ}\text{C}$ ", Vol.60, No.3, pp.871-882, Mar 2025.
- "A 160-MHz BW 68-dB SNDR 36.2 mW Continuous-Time Pipelined  $\Delta\text{-}\Sigma$  ADC with DAC Image Prefiltering", Vol.60, No.3, pp.838-849, Mar 2025.
- "A Multi-Band RF Transmitter Employing a Transformer-Based N-Path Switched-Capacitor Modulator for CIM3 Suppression", pp.1-10, Apr 2025.
- "Phase-Scalable CF-Cross-Connected-Based Hybrid DC-DC Converter with Auto VCF Balancing and Inactive CF Charging", pp.1-12, Apr 2025.
- "An Intrinsically PVT Robust 10-bit 2.6-GS/s Dynamic Pipelined ADC with Dual-Path Time-Assisted Residue Generation Scheme", Vol.60, No.7, pp.2545-2557, Jul 2025.
- "An 800-MHz 8.17-TOPS/W 0.63-TOPS/mm<sup>2</sup> Memory-Utilization-Aware CNN Accelerator Featuring a Memory Stationary Dataflow", Vol.60, No.8, pp.3033-3042, Aug 2025.
- "A Single-Input RF Energy-Harvesting Interface with Compensated-CEPE Control and 3-D Hill-Climbing MPPT Achieving  $-28.5\text{-dBm}$  Sensitivity", Vol.60, No.8, pp.2933-2945, Aug 2025.
- "A Hierarchical-Hybrid Floating-Point Compute-in-Memory Macro Using FP-DAC and FP-ADC for Edge-AI Devices", pp.1-14, Aug 2025.
- "A Bidirectional USB Power Delivery Voltage-Regulating Cable", Vol.60, No.8, pp.2866-2878, Aug 2025.
- "A 1.52-W Capacitor-Drop Sigma-Floating-SC AC/DC Converter for Grid Power to IoT Devices", pp.1-11, Sep 2025.
- "A 4100- $\mu\text{m}^2$  Wire-Metal-Based Temperature Sensor With a Fractional-Discharge FLL and a V2T Converter With  $\pm 0.2^{\circ}\text{C}$  Inaccuracy (3σ) From  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$  and  $45\text{-fJ K}^2$  Resolution FoM in 28-nm CMOS", pp.1-11, Sep 2025.
- "A Shoot-Through-Free 180-MHz Isolated Converter with PG-Downsized PA for Low EMI", pp.1-11, Sep 2025.
- "A Dual-Inductor Quad-Path Hybrid Buck (2L4PHB) Converter with Reduced Inductor Current", Vol.60, No.9, pp.3366-3378, Sep 2025.
- "An Emulated Curve Assisted Fast-Transient Buck Converter with One-Cycle Charge Balance", Vol.60, No.9, pp.3317-3328, Sep 2025.
- "A Compact Low-Power 16 b SAR ADC Using Reservoir-Charge-Redistributed DAC and Configurable FIA-Based Comparator", Vol.60, No.10, pp.3498-3511, Oct 2025.
- "A 0.4-V 32-kHz Pulse-Injection Temperature-Compensated Crystal Oscillator With Sub-Cycle CL Modulation and DLL-Reused Temperature Sensor", pp.1-13, Oct 2025.
- "A 320-MHz NS TD-ADC-Assisted C/DT Hybrid Pipelined ADC with Single OTA Second-Order RAF", Vol.60, No.10, pp.3512-3523, Vol.60, No.10, pp.3512-3523, Oct 2025.
- "A Topology-Level Hybrid High-VCR Input-Parallel-Output-Series Step-Up DC-DC Converter for Flyweight Applications", Oct 2025.
- "A Cryo-CMOS Wideband Mode-Switching Class-F VCO with Harmonic-Resonance Self-Alignment", Vol.60, No.10, pp.3859-3875, Oct 2025.
- "A Segment-Interlace Multi-Phase Hybrid Converter with Concurrent Inductor Energizing and Inherent Current Balancing", pp.1-12, Nov 2025.
- "A 5.2  $\mu\text{W}$ , 2-to-8-Channel Scalable, Speaker-Tracking Microphone Array Featuring a CNN-Defined Analog Front-End", pp.1-10, Nov 2025.
- "A Bi-Directional Dual-Path Boost-Buck Hybrid Converter for High-Voltage Power Transmission Delivery Cable in Humanoid Robots", pp.1-14, Nov 2025.
- "A 72-GS/s 9b Time-Interleaved Pipeline-SAR ADC Achieving 55.3/49.3-dB SFDR at 20-GHz/Nyquist Inputs in 16-nm FinFET", pp.1-17, Nov 2025.

### IEEE Transactions on Circuits and Systems I: Regular Papers

- "A Systematic Review of Voltage Reference Circuits: Spanning Room Temperature to Cryogenic Applications", Vol.72, No.4, pp.1533-1546, Apr 2025.
- "A Resonant Switched-Capacitor Parallel Inductor Hybrid Buck Converter", Vol.72, No.5, pp.2432-2443, May 2025.
- "A Multi-Step ADC with Lightweight Input Buffer Distortion, Sub-Stage Coarse-Fine Gain, and Sampling Skew Background Calibrations", Vol.72, No.11, pp.6567-6577, May 2025.
- "A GaN Driver IC with Asymmetrical dv/dt Current Clamping Level Shifter and Logic-Based Adaptive Deadline Control", Vol.72, No.11, pp.6750-6761, Jun 2025.
- "A 362-TOPS/W Mixed-Signal MAC Macro with Sampling-Weight-Nonlinearity Cancellation and Dynamic-Amplified Accumulation", Vol.72, No.7, pp.3059-3071, Jul 2025.
- "A 97.8 GOPS/W FPGA-Based Residual-Block-Aware CNN Accelerator Featuring Multi-Clock PW<sup>2</sup> Pipeline and Adaptive-Resolution Quantization", Vol.72, No.8, pp.4031-4039, Aug 2025.
- "A 0.5-V Ultra-Low Voltage Relaxation Oscillator with Identical Asymmetric Swing-Boosted RC Network and Feedback-Based Amplifier Achieving 390-ppm RMS Period Jitter for Self-Powered Devices", pp.1-11, Sep 2025.
- "A 3.51 TOPS/mm<sup>2</sup> Transformer Accelerator Exploiting Bipolar Sparsity and Approximate Gating", pp.1-10, Sep 2025.
- "Fully Integrated Single-Input-Dual-Output Switch-Capacitor DC-DC Converter with Fast DVS Speed and Fast Transient Response", pp.1-10, Oct 2025.
- "A 28-nm 3.32-nJ/Frame Compute-in-Memory CNN Processor with Layer Fusion for Always-on Applications", Vol.72, No.10, pp.5683-5695, Oct 2025.
- "Design and Analysis of Small-TX Large-RX Coupler in Wireless Charging System for Mobile Devices", pp.1-11, Oct 2025.
- "A 2-Channel Time-Interleaved Noise-Shaping SAR ADC Directly Powered by a DC-DC Converter", Vol.72, No.11, pp.6364-6377, Nov 2025.

### IEEE Transactions on Circuits and Systems II: Express Briefs

- "A Series-LC-Assisted Oscillator Achieving  $-140.2\text{ dBc/Hz}$  Phase Noise and  $187.5\text{ dBc/Hz}$  FoM at 10 MHz Offset From 10.7 GHz", Vol.72, No.2, pp.389-393, Feb 2025.
- "A 0.35-0.5-V 0.0136-mm<sup>2</sup> 12-MHz Digital Frequency-Locked Loop with 1.061%/V Line Sensitivity in 65-nm CMOS", Vol.72, No.3, pp.459-463, Mar 2025.
- "Analysis and Design of a Type-II Reference-Sampling PLL Using Gain-Boosting Phase Detector with Sampling Capacitor Reduction", Vol.72, No.3, pp.439-443, Mar 2025.
- "A 28-nm MFCC-Free Keyword Switchable Keyword Spotting (KWS) System with Transferred Training Algorithm", Vol.72, No.5, pp.803-807, May 2025.
- "A Single-XO Dual-Output Frequency Reference Featuring Adaptive RTC Calibration Achieving 0.63 ppm/ $^{\circ}\text{C}$  Temperature Coefficient From  $-40^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ ", Vol.72, No.5, pp.688-692, May 2025.

### IEEE Transactions on Power Electronics

- "An Online ESR Estimation Method for Output Capacitor of DC-DC Boost Converter without Current Sensor", Vol.40, No.1, pp.2196-2209, Jan 2025.
- "Tuning Control Against Coupler Parameter Variations Due to Misalignment in an Optimal-Efficiency-Tracking and Constant-Power-Output IPT System", Vol.40, No.5, pp.7500-7511, May 2025.
- "High-Efficiency Wireless Integrated On-Board Charger System Using Partial Power Conversion", Vol.40, No.5, pp.7560-7572, May 2025.
- "High Efficiency Three-Coil Wireless Power Transfer for EV Battery Charging Through Negative-Polarity Partial Power Conversion", Vol.40, No.6, pp.8834-8846, Jun 2025.
- "Model and Data Hybrid Reinforcement Learning for Optimal Voltage-Current Control of Hybrid Active Power Filter", Vol.40, No.9, pp.12845-12857, Sep 2025.

### IEEE Transactions on Microwave Theory and Techniques

- "A 50-Gb/s 1.35-pJ/b PAM-4 VCSEL Transmitter with Three-Tap Asymmetric FFE and Current-Reuse Technique in 40-nm CMOS", Vol.73, No.7, pp.3855-3864, Jul 2025.
- "An 18.4 GHz Low-Jitter and Fast-Locking Fractional-N Digital PLL Using Function-Reused TDC and Path-Selection BBPDs", Vol.73, No.11, pp.8929-8941, Nov 2025.

### Other High Quality SCI Publications

- "Wideband Continuous-Time MASH ADCs: Principles, Challenges, and Prospects", *IEEE Open Journal of the Solid-State Circuits Society*, Vol.5, pp.104-115, Feb 2025.
- "Sapphire-Based Optrode for Low Noise Neural Recording and Optogenetic Manipulation", *ACS Chemical Neuroscience*, Vol.16, No.4, pp.628-641, Feb 2025.
- "A Misalignment-Tolerant AUV-Capable Magnetic Coupler for Underwater Wireless Charging Systems", *IEEE Open Journal of the Industrial Electronics Society*, Vol.6, pp.548-559, Mar 2025.
- "Dynamic Path Gain Compensation for Enhancing Intracardiac Communication in Leadless Pacemakers", *IEEE Transactions on Instrumentation and Measurement*, Vol.74, pp.1-11, Mar 2025.
- "Enhanced Mode Localization in 2-DoF Weakly Coupled Electrostatic MEMS Resonant Sensor Devices via Blue-Sideband Excitation", *IEEE Transactions on Electron Devices*, Vol.72, No.3, pp.1345-1351, Mar 2025.
- "An Inverter-Based Sampling Front-End Achieving  $>46\text{-dB}$  SFDR at 50-GHz Input", *IEEE Solid-State Circuits Letters*, Vol.8, pp.81-84, Mar 2025.
- "A MEMS electro-mechanical co-optimization platform featuring freeform geometry optimization based on a genetic algorithm", *Microsystems and Nanoengineering*, Vol.11, No.1, Apr 2025.
- "A Dynamic High-Fidelity Equivalent Circuit Phantom for Intracardiac Communication in Pacemaker Indications", *IEEE Transactions on Instrumentation and Measurement*, Vol.74, pp.1-12, Apr 2025.
- "UV-assisted ratiometric fluorescence sensor for one-pot visual detection of Salmonella", *Chinese Chemical Letters*, Vol.36, No.4, Apr 2025.
- "Portable intelligent digital microfluidic system for rapid antibiotic susceptibility testing", *Chemical Engineering Journal*, Vol.512, May 2025.
- "A Switched-Capacitor Single-Inductor Multiple-Output Dual-Path Hybrid DC-DC Converter with Path-Sharing Technique", *Electronics Letters*, Vol.61, No.1, May 2025.
- "Alginate-gelatin hydrogel scaffolds for establishing physiological barriers on a gut-brain-axis microchip", *International Journal of Biological Macromolecules*, Vol.312, Jun 2025.
- "Sliding-Mode-Based Model Predictive Control for Enhancing Robustness and Output Performance in Dynamic Inductive Power Transfer Systems", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol.13, No.3, pp.3944-3954, Jun 2025.
- "DFE: Deep Flow Embedding for Robust Network Traffic Classification", *IEEE Transactions on Network Science and Engineering*, Vol.12, No.3, pp.1597-1612, Jun 2025.
- "Progress and trends of low-jitter fractional-N PLL", *Journal of Semiconductors*, Vol.46, No.7, Jul 2025.
- "Identification and Drug Screening of Single Cells from Human Tumors on Semiconductor Chip for Cancer Precision Medicine", *Advanced Science*, Vol.12, No.28, Jul 2025.
- "Layered Semi-Second-Order Information Bottleneck and Auxiliary Domain Classification for Person Re-Identification", *International Journal of Computer Vision*, Vol.133, pp.7794-7816, Aug 2025.
- "Droplet-Based Microfluidics in Single-Bacterium Analysis: Advancements in Cultivation, Detection, and Application", *Biosensors-Basel*, Vol.15, No.8, Aug 2025.
- "Wound healing accelerated by stem cell bandage", *Chemical Engineering Journal*, Vol.517, Aug 2025.
- "Toward a Tunable AIN-Based Piezoelectric MEMS Microphone: Design, Characterization, and Analysis", *Journal of Microelectromechanical Systems*, Vol.34, No.4, pp.432-442, Aug 2025.
- "Design and Analysis of a Load-Independent Three-Coil Inductive Power Transfer System for Battery Charging", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, pp.1-1, Sep 2025.
- "SVRm: A 9.52-mW Video Understanding Smart Vision SoC with On-Chip Sensing and Similarity-Aware SRAM/ROM CIM Macro", *IEEE Transactions on Very Large Scale Integration (VLSI) Systems*, pp.1-14, Sep 2025.
- "A 280-GHz Lensless Triple-Push Radiator with Source-Combining Technique", *IEEE Microwave and Wireless Technology Letters*, pp.1-4, Sep 2025.
- "An LCC-S-S Compensated Three-Coil Wireless Charging System for Offshore USV Charging", *IEEE Journal of Emerging and Selected Topics in Power Electronics*, Vol.13, No.5, pp.6768-6779, Oct 2025.
- "MemMIMO: A Simulation Framework for Memristor-Based Massive MIMO Acceleration", *IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems*, Vol.44, No.11, pp.4327-4340, Nov 2025.
- "High-resolution melting curve analysis with linear temperature gradient in digital microfluidics platform", *Sensors and Actuators B: Chemical*, Vol.445, Dec 2025.
- "Charge transfer-enhanced OECT glucose sensor with superabsorbent polymer composites for non-invasive breath analysis", *Sensors and Actuators B: Chemical*, Vol.444, Dec 2025.

# STATE KEY LAB OF AMSV PUBLICATIONS IN 2025

## Major IEEE Solid-state Circuit Conference

### IEEE International Solid-State Circuits Conference (ISSCC), Feb 2025

- Fei Song, Shousheng Han, Rui Paulo Da Silva Martins, Yan Lu. "An 85-to-230VAC to 3.3-to-4.6VDC 1.52W Capacitor-Drop Sigma-Floating-SC AC-DC Converter with 81.3% Peak Efficiency", Session 9, pp. 178-180. DOI: 10.1109/ISSCC49661.2025.10904504.
- Wenzie Yang, Zhiguo Tong, Junwei Huang, Rui Paulo Da Silva Martins, Yan Lu. "A Bi-Directional Dual-Path Boost-48V-Buck Hybrid Converter for High-Voltage Power-Transmission Cable in Light-Weight Humanoid Robots", Session 9, pp. 194-196. DOI: 10.1109/ISSCC49661.2025.10904797.
- Yu Duan, Yan Zhu, Rui Paulo Da Silva Martins, Chihang Chan. "A PVT-Robust 5.5GHz Fractional-N Cascaded RO-Based Digital PLL with Voltage-Domain Feedforward Noise Cancellation", Session 19, pp. 324-326. DOI: 10.1109/ISSCC49661.2025.10904636.
- Haoran Li, Jinghe Li, Xueying Jiang, Xi Meng, Jun Yin, Rui Paulo Da Silva Martins, Pui-In Mak. "A 27GHz Fractional-N Sub-Sampling PLL Achieving 57.9fs<sub>rms</sub> Jitter, -249.7dB FoM, and 1.98μs Locking Time Using a Polarity-Reversible SSPD", Session 19, pp. 336-338. DOI: 10.1109/ISSCC49661.2025.10904556.
- Haochen Zhang, Weihai Yu, Zhongyu Zhao, Zhihan Yang, Kai Fan, Jun Yin, Rui Paulo Da Silva Martins, Pui-In Mak. "A 9.4nW Battery-Free Intelligent Silicon Platform Enabling Distributed, Adaptive, and Event-Driven Multimodal Sensing at the Edge", Session 20, pp. 362-364. DOI: 10.1109/ISSCC49661.2025.10904523.
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- Ruilin Liao, Haoran Wang, Jingzhi Zhang, Weihang Yu, Yue Song, Hongyang An, Huihua Liu, Kai Kang. "A 15/30/60-GHz 1TX/4RX Radar Chipset Achieving 6° Angular Resolution Using Frequency Dimension for Virtual Aperture Expansion", pp. 395-398. DOI: 10.1109/RFIC61188.2025.11082860.
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- Wenliang Zeng, Gyeong-gu Kang, Haoran Li, Mian Liao, Daniel H. Zhou, Youssef Elasser, Minjie Chen. "Chiplet-LEGO: Delivering Multiple Voltage Rails to Chiplets with Chiplet VRMs", pp. 1-8. DOI: 10.1109/COMPEL57166.2025.11121243.

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- Chunlin Tian, Xinpeng Qin, Kahou Tam, Li Li, Zijian Wang, Yuanzhe Zhao, Minglei Zhang, Chengzhong Xu. "CLONE: Customizing LLMs for Efficient Latency-Aware Inference at the Edge", pp. 563-585.

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- Io-Wa Lam, Zongrui Yang, Chi-Fong Leong, Chi-Seng Lam. "Ground-to-Chassis Distance Adaptive Photovoltaic Inductive Wireless Power Transfer System for Electric Vehicles", pp. 1-5. DOI: 10.1109/IECON58223.2025.11221609.
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Stephanie Andaluz, Ren Shen, Miguel Brito, Tzu-Ming Liu and Yanwei Jia. "NOX: Innovating Sickle Cell Disease Genetic Diagnosis with Microfluidic Disposable Chips".

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