**Rui Paulo da Silva Martins**
**Vice Rector (Global Affairs), University of Macau**
**Chair Professor ECE, IEEE Fellow**
**Academician, Academy of Sciences of Lisbon, Portugal**
**Director, State Key Lab AMSV & Institute of Microelectronics**

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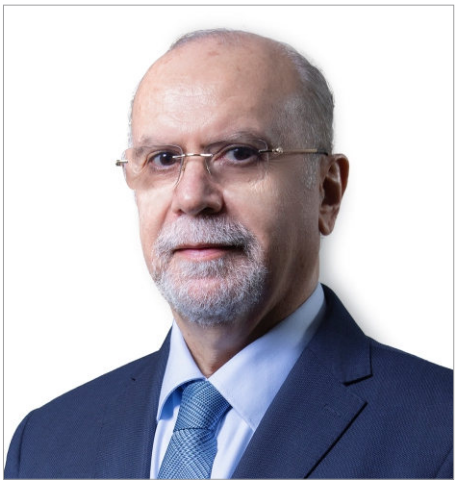

## RESEARCH INTERESTS

Data Conversion and Signal Processing
Wireless IC
Biomedical IC
Integrated Power Electronics
Multidisciplinary Area of Microfluidics, Lab-on-a-Chip

## PROFESSIONAL SERVICES

- Member, Advisory Board, Journal of Semiconductors, Chinese Institute of Electronics – CIE, Institute of Semiconductors, Chinese Academy of Sciences, 2021 - 2023
- Vice-Chair, IEEE CASS Fellow Evaluation Committee, Classes of 2021 & 2022
- General Chair, IEEE A-SSCC 2019
- Member, IEEE CASS Fellow Evaluation Committee, Class of 2019
- Chairman, IEEE CASS Fellow Evaluation Committee, Class of 2018
- General Chair, ACM/IEEE ASP-DAC 2016
- Nominations Committee Member, IEEE CAS Society 2016
- Division I (CASS, EDS, SSCS) – Director of IEEE, Nominating Committee, Representative of CASS, 2014
- IEEE CAS Society Fellow Evaluation Committee, Classes of 2013 & 2014
- Vice-President (World), Regional Activities and Membership of the IEEE CAS Society 2012-2013
- Associate Editor, IEEE TCAS-II 2010-2013
- Vice-President (Region 10/Asia, Australia, The Pacific) of the IEEE CAS Society 2009-2012
- General Chair, IEEE APCCAS 2008
- Founding Chairman, IEEE Macao Chapter CAS/COM, 2005-2008
- Founding Chairman, IEEE Macao Section, 2003-2005

## AWARDS

- Macao Science & Technology Invention Awards (1st Prize) 2020, (2nd Prize) 2012, 2014, and 2016, 2020
- ISSCC 2018 - Takuo Sugano Award, 2018
- ASP-DAC 2018 - University LSI Design Contest Special Feature Award, 2018
- IEEE Council on Electronic Design Automation (CEDA) Outstanding Service Award 2016, Tokyo, Japan
- Business Awards of Macau – Innovation Excellence Award, 2014 (attributed to the SKL-AMSV)
- IEEE ISSCC Silk-Road Award 2011 and 2016 (as co-supervisor)
- IEEE Circuits and Systems Society "World-Chapter of the Year" 2009 (as Founding Chapter Chair)
- "Honorary Title of Value", Decoration attributed by the Macao Special Administrative Region Government (Chinese Administration), 2001
- "Medal of Merit (Class of Professional Merit)", Decoration attributed by the Macao Government (Portuguese Administration), 1999

## THESIS SUPERVISED (OR CO-SUPERVISED)

**26 Ph.D.**

## SELECTED PUBLICATIONS

- Rui P. Martins, Pui-In Mak, Sai-Weng Sin, et al., "Revisiting the Frontiers of Analog and Mixed-Signal Integrated Circuits Architectures and Techniques towards the future Internet of Everything (IoE) Applications", Foundations and Trends in Integrated Circuits and Systems, Now Publishers, Boston-Delft, in press, 2021 [Invited Paper]
- Rui P. Martins, Pui-In Mak, Chi-Hang Chan, Jun Yin, Yan Zhu, Yong Chen, Yan Lu, Man-Kay Law, Sai-Weng Sin, "Bird's-eye view of analog and mixed-signal chips for the 21st century", International Journal of Circuit Theory and Applications, Wiley Online Library, vol.49, pp.746-761, March 2021 [Invited Paper]
- Haoran Li, Ren Shen, Cheng Dong, Tianlan Chen, Yanwei Jia, Pui-In Mak, Rui P. Martins, "Turning on/off satellite droplet ejection for flexible sample delivery on digital microfluidics", Lab on a Chip, Royal Society of Chemistry, vol.20, pp.3709-3719, October 2020 [Inside Front Cover]
- Ren Shen, Yanwei Jia, Pui-In Mak, Rui P. Martins, "Clip-to-release on amplification (CRoA): a novel DNA amplification enhancer on and off microfluidics", Lab on a Chip, Royal Society of Chemistry, vol.20, pp.1928-1938, March 2020 [Outside Back Cover]
- Shiheng Yang, Jun Yin, Pui In Mak, R. P. Martins, "A 0.0056mm2 all-digital MDLL using edge re-extraction, dual-ring VCOs and a 0.3mW block-sharing frequency tracking loop achieving 292fsrmsJitter and −249dB FOM", IEEE International Solid - State Circuits Conference - (ISSCC), February 2018 [Invited Special Paper: "A 0.0056-mm2 -249-dB-FoM All-Digital MDLL using a Block-Sharing Offset-Free Frequency-Tracking Loop and Dual Multiplexed-Ring VCOs", IEEE Journal of Solid-State Circuits, vol.54, No.1, pp.88-98, January 2019]
- Yang Jiang, Man-Kay Law, Pui In Mak, R. P. Martins, "A 0.22-to-2.4V-Input Fine-Grained Fully-Integrated Rational Buck-Boost SC DC-DC Converter Using Algorithmic Voltage-Feed-In (AVFI) Topology Archiving 84.1% Peak Efficiency at 13.2μW/mm2", IEEE International Solid - State Circuits Conference - (ISSCC), February 2018 [Invited Special Paper: "Algorithmic Voltage-Feed-In Topology for Fully Integrated Fine-Grained Rational Buck-Boost Switched-Capacitor DC-DC Converters", IEEE Journal of Solid-State Circuits, vol.53, No.12, pp.3455-3469, December 2018]
- Mo Huang, Yan Lu, Seng-Pan U, R. P. Martins, A Reconfigurable Bidirectional Wireless Power Transceiver with Maximum Current Charging Mode and 58.6% Battery-to-Battery Efficiency, 2017 IEEE International Solid - State Circuits Conference - (ISSCC) [Takuo Sugano Award for Outstanding Far-East Paper 2018], February 2017] [Also published as: Mo Huang, Yan Lu, Rui P.Martins, "A Reconfigurable Bidirectional Wireless Power Transceiver for Battery-to-Battery Wireless Charging", IEEE Transactions on Power Electronics, vol.34, No.8, pp.7745-7753, August 2019]
- Ka-Meng Lei, Hadi Heidari, Pui-In Mak, Man-Kay Law, Franco Maloberti, Rui P.Martins, "A Handheld 50pM-Sensitivity Micro-NMR CMOS Platform with B-Field Stabilization for Multy-Type Biological/Chemical Assays", IEEE International Solid-State Circuits Conference (ISSCC), February 2016 [Silk-Road Award for a Ph.D. Student from IEEE R-10]
- He-Gong Wei, Chi-Hang Chan, U-Fat Chio, Sai-Weng Sin, Seng-Pan U, Rui P.Martins, Franco Maloberti, "A 0.024mm2 8-bit 400 MS/s SAR ADC with 2-bit/Cycle and Resistive DAC in 65 nm CMOS", IEEE International Solid-State Circuits Conference (ISSCC), February 2011 [Silk-Road Award for a Ph.D. Student from IEEE R-10]
- Yan Zhu, Chi-Hang Chan, U-Fat Chio, Sai-Weng Sin, Seng-Pan U, Rui P.Martins, Franco Maloberti, "A 10-bit 100-MS/s Reference-Free SAR ADC in 90 nm CMOS", IEEE Journal of Solid-State Circuits, vol.45, No.6, pp.1111-1121, June 2010 [Most cited journal paper of the SKLAB – 547 Citations in Google Scholar, October 2021]

**Pui-In Mak (Elvis)**
**Professor, IEEE Fellow, IET Fellow, RSC Fellow**
**Chinese Academy of Sciences Overseas Expert**
**Deputy Director, State-Key Laboratory of Analog and Mixed-Signal VLSI**
**Deputy Director (Research), Institute of Microelectronics**

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## RESEARCH INTERESTS

4G/5G Cellular Transceivers (sub-6GHz, >28 GHz)
IoT Transceivers (Bluetooth LE, ZigBee)
Analog Techniques (amplifier, filter, crystal oscillator)
Portable In-Vitro Diagnostic Devices (DNA, Virus, proteins)
Microfluidic Technologies (digital, channel, hybrid)
Machine Learning Circuits (in-memory computing)

## PROFESSIONAL SERVICES

- Chair of Distinguished Lecturer, IEEE CASS 2018-2019
- Distinguished Lecturer, IEEE SSCS 2017-2018
- Associate Editor, IEEE JSSC 2018-Present
- Associate Editor, IEEE SSCL 2017-Present
- Conference Chair, ICAC, 2019-2021
- TPC Member, IEEE ISSCC 2017-2019
- TPC Member, IEEE A-SSCC 2019
- TPC Member, IEEE ESSCIRC 2016-2017

## AWARDS

- IEEE RFIC Best Student Paper Award'21
- Macao Science & Technology Invention
- Award – First Class '20
- Commemorative Medal, PRC's 70th Anniversary'19
- UM FST 30th Anniversary Outstanding Alumni Award'19
- IEEE APCCAS Best Paper Award'19

## CURRENT GROUP MEMBERS

**Ph.D.**
Zhao Xianteng, 2017 (co-supervisor)
Guo Han, 2017 (co-supervisor)
Yang Zunsong, 2017 (co-supervisor)
Shao Haijun, 2018
Chen feifei, 2018
Meng Xi, 2018 (co-supervisor)
Xu Tailong, 2018 (co-supervisor)
Mao Jiaji, 2019 (co-supervisor)
Lin Liwen, 2019
Li Jixuan, 2019 (co-supervisor)
Tan Fei, 2020

## SELECTED PUBLICATIONS

- G. Qi, H. Shao, P.-I. Mak, J. Y. and R. P. Martins, "A Multiband FDD SAW-less Transmitter for 5G-NR Using a BW-Extended N-Path Filter-Modulator, a Switched-BB Input and a Wideband TIA-Based PA Driver," IEEE Journal of Solid-State Circuits, vol. 55, pp. 3387-3399, Dec. 2020. [Also in ISSCC'20]

- S. Yang, J. Yin, H. Yi, W.-H. Yu, P.-I. Mak, R. P. Martins, "A 0.2-V Energy-Harvesting BLE Transmitter with a Micropower Manager Achieving 25% System Efficiency at 0-dBm Output and 5.2-nW Sleep Power in 28nm CMOS," IEEE Journal of Solid-State Circuits, vol. 54, pp. 1351-1362, May 2019. [Also in ISSCC'18]

- S. Yang, J. Y., P.-I. Mak, R. P. Martins, "A 0.0056-mm2 −249-dB-FOM All-Digital MDLL Using a Block-Sharing Offset-Free Frequency-Tracking Loop and Dual Multiplexed-Ring-VCOs," IEEE Journal of Solid-State Circuits, vol. 54, pp. 88-98, Jan. 2019. [Also in ISSCC'18]

- C.-C. Lim, H. Ramiah, J. Yin, P.-I. Mak, R. P. Martins, "An Inverse-Class-F CMOS Oscillator with Intrinsic-High-Q 1st-Harmonic and 2nd-Harmonic Resonances," IEEE Journal of Solid-State Circuits, vol. 53, pp. 3528-3539, Dec. 2018. [Also in ISSCC'18]

- K.-M. Lei, P.-I. Mak, M.-K. Law, R. P. Martins, "A Regulation-Free Sub-0.5 V 16/24-MHz Crystal Oscillator with 14.2-nJ Startup Energy and 31.8-µW Steady-State Power," IEEE Journal of Solid-State Circuits, vol. 53, pp. 2624-2635 , Sept. 2018. [Also in ISSCC'18]

- H. Yi, W.-H. Yu, P.-I. Mak, J. Yin, R. P. Martins, "A 0.18V 382µW Bluetooth Low-Energy (BLE) Receiver Front-End with 1.33nW Sleep Power for Energy-Harvesting Applications in 28nm CMOS," IEEE Journal of Solid-State Circuits, vol. 53, pp. 1618-1627, Jun. 2018. [Also in ISSCC'17]

- G. Qi, B. Liempd, P.-I. Mak, R. P. Martins, J. Craninckx, "A SAW-Less Tunable RF Front-End for FDD and IBFD Combining an Electrical-Balance Duplexer and a Switched-LC N-Path LNA," IEEE Journal of Solid-State Circuits, vol. 53, pp. 1431-1442, May 2018.

**Sai-Weng Sin (Terry)**
**Associate Professor, IEEE Senior Member**
**Associate Director (Academic), State-Key Laboratory of Analog and Mixed-Signal VLSI**
**Deputy Director (Academic), Institute of Microelectronics**

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## RESEARCH INTERESTS

High-Performance Data Converters
- Nyquist Data Converters
- Oversampling Data Converters

Power Management Integrated Circuits
Analog and Mixed-Signal Integrated Circuits
Analog Integrated Circuits for Artificial Intelligence

## PROFESSIONAL SERVICES

- TPC Member, A-SSCC 2013-Present
- SDC Member, A-SSCC 2013-Present
- RCM Member, ISCAS 2017-Present
- Subcommittee Chair, ICTA 2018-Present
- Associate Editor, IEEE Transactions on Circuits and Systems II – Express Briefs
- Associate Editor, IEEE Access
- Editorial Board Member, MDPI Electronics
- Secretary, IEEE Solid-State Circuit Society (SSCS) Macau Chapter, 2009-2016
- Treasurer/Secretary, IEEE Macau CAS/COM Joint Chapter, 2009-2016
- Treasurer (Local Organization Committee), A-SSCC, 2019

## AWARDS

- National Scientific & Technological Progress Award'11
- Macao Science & Technology Special Awards'12
- Macao Science & Technology Invention Awards'12'14'16'20
- IEEE ISSCC Silkroad Award'11
- IEEE SSCS Pre-Doctoral Achievement Award 2015 (as advisor)
- IEEE CASS Scholarship Award 2017 (as advisor)
- IEEE A-SSCC Best Student Design Contest Award'11 (as advisor)
- IEEE ICTA Best Paper Award'19
- IEEE ASICON Best Student Paper Award'19 (as advisor)

## CURRENT GROUP MEMBERS

**Ph.D.**
Dongyang Jiang, 2014
Chengzhe Liu, 2019
Ke Li, 2019
Ran Zhang, 2019
Haoyu Gong, 2020
Xueru Cen, 2020
Yang Lu, 2020

**M.Sc.**
Song Cui, 2016
Qingyu Ma, 2017
Shulin Zhao, 2018

**POST-DOC./R.A.**
Mingqiang Guo, 2020

## SELECTED PUBLICATIONS

- D. Jiang, L. Qi, S.-W. Sin, F. Maloberti, R.P.Martins, "A Time-Interleaved 2nd-order ΔΣ Modulator Achieving 5 MHz Bandwidth and 86.1dB SNDR Using Digital Feedforward Extrapolation," in press in IEEE Journal of Solid-State Circuits [Also in VLSI'20].

- M. Guo, J. Mao, S.-W. Sin, H. Wei, R.P.Martins, "A 1.6GS/s 12.2mW 7/8-way Split Time-Interleaved SAR ADC achieving 54.2-dB SNDR with Digital Background Timing Mismatch Calibration," in IEEE Journal of Solid-State Circuits, vol. 55, Issue 3, pp. 693-705, Mar 2020 [invited special issue of CICC'19].

- L. Qi, A. Jain, D. Jiang, S.-W. Sin, R. P. Martins and M. Ortmanns, "A 76.6dB-SNDR 50MHz-BW 29.2mW Multibit CT Sturdy MASH with DAC Non-Linearity Tolerance," in IEEE Journal of Solid-State Circuits, vol. 55, Issue 2, pp. 344-355, Mar 2020 [Also in ISSCC'19].

- U. Chio, K.-C. Wen, S.-W. Sin, C.-S. Lam, Y. Lu, F. Maloberti, R. P. Martins, " An Integrated DC-DC Converter with Segmented Frequency Modulation and Multiphase Co-Work Control for Fast Transient Recovery", in IEEE Journal of Solid-State Circuits, vol. 54, Issue 10, pp. 2637-2648, Oct 2019 [Invited Special Issue of A-SSCC'18].

- B. Wang, S.-W. Sin, S.-P. U, F. Maloberti, R. P. Martins, "A 550μW 20kHz BW 100.8dB SNDR Linear-Exponential Multi-Bit Incremental ΣΔ ADC with 256 clock cycles in 65nm CMOS", in IEEE Journal of Solid-State Circuits, vol. 54, Issue 4, pp. 1161-1172, Apr 2019 [Invited Special Issue of VLSI'18].

**Man-Kay Law (Matthew)**
**Associate Professor, IEEE Senior Member**
**Laboratory Infrastructure Coordinator, Institute of Microelectronics**

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## RESEARCH INTERESTS

CMOS Image Sensor
CMOS Temperature Sensor
Analog Techniques/Sensor Interface Circuits
Voltage/Current References
Energy Harvesting Circuits and Systems

## PROFESSIONAL SERVICES

- Distinguished Lecturer, SSCS, 2019-2021
- Distinguished Lecturer, CASS, 2018-2021
- Guest Editor, IEEE JSSC, 2021
- Guest Editor, IEEE Access, 2020
- TPC Member, IEEE ISSCC 2018-Present
- TPC Member, IEEE ASP-DAC 2016
- TC Member, IEEE CASS SSTC, 2012-Present
- TC Member, IEEE CASS BioCAS TC, 2012-Present
- RC Member, IEEE ISCAS, 2012-Present

## AWARDS

- Macau FDCT Technology Invention Award, 1st Class, '20
- Macau FDCT Technology Invention Award, 2nd Class, '14'18
- Invited Keynote Speaker, IEEE ICTA'20
- IEEE SSCS Pre-Doctoral Achievement Awards'18 (as advisor)
- IEEE ISSCC Silkroad Award'16 (as advisor)
- IEEE ASPDAC Best Design Award'16
- IEEE A-SSCC Distinguished Design Award'15
- IEEE ISQED, Student Paper Award'13 (as advisor)

## CURRENT GROUP MEMBERS

**Ph.D.**
Li Meng, 2020
Chongyao Xu, 2019
Guangshu Zhao, 2019
Chi-Wah U, 2019 (co-supervisor)
Jiangchao Wu, 2016
Xin Lu, 2016

**M.Sc.**
Yangyang Liu, 2019
Yu Lei, 2019
Jieyun Zhang, 2018

**POST-DOC./R.A.**
Chao Xie, 2020

## SELECTED PUBLICATIONS

- Z. Chen, M. K. Law, P. I. Mak, X. Zeng and R. P. Martins, "Piezoelectric Energy Harvesting Interface using Split-Phase Flipping-Capacitor Rectifier with Capacitor-Reuse for Input Power Adaptation," IEEE J. Solid-State Circuits, vol. 55, no. 8, pp. 2106-2117, Aug. 2020. [Also in ISSCC 2019]

- Y. Jiang, M. K. Law, P. I. Mak and R. P. Martins, "Algebraic Series-Parallel-Based Switched-Capacitor DC-DC Boost Converter With Wide Input Voltage Range and Enhanced Power Density," IEEE J. Solid-State Circuits, vol. 54, no. 11, pp. 3118-3134, Nov. 2019.

- Y. Jiang, M. K. Law, P. I. Mak and R. P. Martins, "Algorithmic Voltage-Feed-In Topology for Fully Integrated Fine-Grained Rational Buck-Boost Switched-Capacitor DC-DC Converters," IEEE J. Solid-State Circuits, vol. 53, no. 12, pp. 3455-3469, Dec. 2018. [Also in ISSCC'18]

- Z. Chen, M. K. Law, P. I. Mak, W. H. Ki and R. P. Martins, "Fully-Integrated Inductor-less Flipping-Capacitor Rectifier (FCR) for Piezoelectric Energy Harvesting," IEEE J. Solid-State Circuits, vol. 52, no. 12, pp. 3168-3180, Dec. 2017. [Also in ISSCC'17]

- Xin Lu, Man-Kay Law, Yang Jiang, Xiaojin Zhao, Pui-In Mak and Rui P. Martins, "A 4μm Diameter SPAD Using Less-doped N-Well Guard Ring in Baseline 65nm CMOS," IEEE Transactions on Electron Devices, vol. 67, pp. 2223-2225, May 2020.

**Yan Zhu (Julia)**
**Associate Professor, IEEE Senior Member**
**Industrial Collaboration Coordinator, Institute of Microelectronics**

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## RESEARCH INTERESTS

High-Speed ADCs
ADC Buffer
ADC LDO and Reference Buffer
ADC Calibration
Noise-shaping SAR ADCs
Hybrid ADCs
Mixed-Signal Circuits

## PROFESSIONAL SERVICES

- Reviewer of IEEE JSSC, SSCL, TCAS-I, TCAS-II, TVLSI, Access, etc. TPC of ISSCC and A-SSCC

## CURRENT GROUP MEMBERS

**Ph.D.**
Buhui Rui
Lai Wei
Zihao Zheng
Zixuan Xu
Xianghui Pan
Yu Duan
Junlin Zhong
Jiahao Liu

**M.Sc.**
Yaozhong Ou
Yi Zeng

**POST-DOC./R.A.**
Jiang Wenning
Yanbo Zhang
Junyan Hao
Zhang Yanna
Zhang Hongzhi

## SELECTED PUBLICATIONS

- Z. Zheng et al., "16.3 A Single-Channel 5.5mW 3.3GS/s 6b Fully Dynamic Pipelined ADC with Post-Amplification Residue Generation," 2020 IEEE International Solid - State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2020, pp. 254-256.

- M. Zhang, Y. Zhu, C. H. Chan, and R. P. Martins, "A 8-bit 10-GS/s 16× interpolation-based time-domain ADC with <1.5-ps uncalibrated quantization steps," IEEE Journal of Solid-State Circuits, vol. 55, no. 12, pp. 3225-3235, Dec. 2020.

- Y. Song, Y. Zhu, C. H. Chan and R. P. Martins, "9.6 A 2.56mW 40MHz-Bandwidth 75dB-SNDR Partial-Interleaving SAR-Assisted NS Pipeline ADC With Background Inter-Stage Offset Calibration," 2020 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2020, pp. 164-166.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6-V 13-bit 20-MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE Journal of Solid-State Circuits, vol. 54, no. 12, pp. 3396-3408, Dec. 2019.

- X. Yang, C. Chan, Y. Zhu and R. P. Martins, "16.3 A −246dB Jitter-FoM 2.4GHz Calibration-Free Ring-Oscillator PLL Achieving 9% Jitter Variation Over PVT," 2019 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2019, pp. 260-262.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 4× interleaved 10GS/s 8b time-domain ADC with 16× interpolation-based inter-stage gain achieving >37.5dB SNDR at 18GHz input," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2020, pp. 252-253.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6V 13b 20MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2019, pp. 66-67.

- W. Jiang, Y. Zhu, M. Zhang, C. Chan and R. P. Martins, "3.2 A 7.6mW 1GS/s 60dB SNDR Single-Channel SAR-Assisted Pipelined ADC with Temperature-Compensated Dynamic Gm-R-Based Amplifier," 2019 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2019, pp. 60-62.

**Yan Lu**
**Associate Professor, IEEE Senior Member**
**Microelectronics Research Center/ZUMRI Coordinator,**
**Institute of Microelectronics**
**Member, Microelectronics Education Committee,**
**Institute of Microelectronics**

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## RESEARCH INTERESTS

Wireless Power Transfer Systems and Circuits
Highly-Integrated DC-DC Power Converters
Linear Voltage Regulators
Energy Harvesting Circuits (RF and Solar)

## PROFESSIONAL SERVICES

- Young Editor, Journal of Semiconductor 2021-2023
- Guest Editor, IEEE TCAS-I 2019
- Guest Editor, IEEE TCAS-II 2018 and 2019
- Co-Founder, Workshop on IC Advances in China (ICAC)
- Steering Committee Member, IEEE ICTA 2020-Present
- TPC Member, IEEE ISSCC 2019-Present
- TPC Member, IEEE CICC 2019-Present
- TPC Member, IEEE ISCAS 2016-2020

## AWARDS

- Macao S&T Invention Awards 2nd Prize 2018 and 2020
- IEEE ISSCC Outstanding Far-East Paper 2017
- IEEE CASS Outstanding Young Author Award 2017
- IEEE SSCS Pre-Doctoral Achievement Award 2013-14
- PSMA PwrSoC Best Student Poster 1st Prize (as Advisor) 2018

## CURRENT GROUP MEMBERS

**Ph.D.**
Guigang Cai, 2017
Xianglong Bai, 2017 (UM-SUSTech Joint Program)
Shuangxing Zhao, 2017 (UM-SUSTech Joint Program)
Chengyu Huang, 2018 (UM-SUSTech Joint Program)
Junwei Huang, 2018 (co-supervisor)
Yifan Jiang, 2019
Xiangyu Mao, 2019
Yang Li, 2021
Zhiguo Tong, 2021

**M.Sc.**
Han Yin, 2018
Shengnan Zhou, 2019
Zixiao Lin, 2019
Nan Shi, 2021

**POST-DOC./R.A.**
Chuang Wang, 2018
Fangyu Mao, 2020
Xiaofei Li, 2021

## SELECTED PUBLICATIONS

- J. Lin, Y. Lu, C. Zhan, and R. P. Martins, "A Single-Stage Dual-Output Regulating Rectifier with Hysteretic Current-Wave Modulation," IEEE Journal of Solid-State Circuits, early access online.
- F. Mao, Y. Lu, E. Bonizzoni, F. Boera, M. Huang, F. Maloberti, and R. P Martins, "A Hybrid Single-Inductor Bipolar-Output DC-DC Converter With Floating Negative Output for AMOLED Displays," IEEE Journal of Solid-State Circuits, early access online.
- X. Li, F. Mao, Y. Lu, and R. P. Martins, "A VHF Wide-Input Range CMOS Passive Rectifier With Active Bias Tuning," IEEE Journal of Solid-State Circuits, vol. 55, no. 10, pp. 2629–2638, Oct. 2020.
- F. Mao, Y. Lu, and R. P. Martins, "A Reconfigurable Cross-Connected Wireless-Power Transceiver for Bidirectional Device-to-Device Wireless Charging," IEEE Journal of Solid-State Circuits (JSSC), vol. 54, no. 9, pp. 2579-2589, Sep. 2019. [Also in ISSCC 2018]
- M. Huang, Y. Lu, and R. P. Martins, "A Reconfigurable Bidirectional Wireless Power Transceiver for Battery-to-Battery Wireless Charging," IEEE Transactions on Power Electronics, vol. 34, no. 8, pp. 7745–7753, Aug. 2019. [Also in ISSCC 2017]
- G. Cai, Y. Lu, C. Zhan, and R. P. Martins, "A Fully Integrated FVF LDO With Enhanced Full-Spectrum Power Supply Rejection," IEEE Transactions on Power Electronics, vol. 36, no. 4, pp. 4326–4337, Apr. 2021.
- Y. Lu, M. Huang, and R. P. Martins, "PID Control Considerations for Analog-Digital Hybrid Low-Dropout Regulators," in IEEE International Conference on Electron Devices and Solid-State Circuits (EDSSC), Jun. 2019.

**Vai Mang I**
**Associate Professor**
**IEEE Senior Member**

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## RESEARCH INTERESTS

Optrode (electronics circuits)
Neural Spiking Network (hardware implementation, algorithms)
CMUT (transducer design and modeling, front end, imaging)
Embedded Systms (RTOS, multi-tasking)

## PROFESSIONAL SERVICES

- Board Member, CBME 2016-2021
- President, MSBME 2009-2021
- Advisor, IEEE Macau, 2013-2021
- Board Member, IEEE EMBS Hong Kong - Macau Joint Chapter, 2013-2021
- Board Member, **中國生物醫學工程學會神經醫學工程分會委員會**, 2014-2021
- Board Member, **中國電子學會生物醫學電子學分會**, 2003-2021
- Board Member, **中國電子學會信息論分會**, 2008-2021
- **評審委員**, **全国青少年科技创新大赛**, 2017-2018
- Chair, **澳門城市總體規劃諮詢文本交流會**, 2020
- Invited Keynote Speaker, **人体机能实验教学研讨会**, 2021
- Invited Speaker, **浙江大学西湖学术论坛**, 2019
- Invited Speech, SUST, 2018
- TPC Member, 2020 International Conference on Medical Material and Chemical Engineering
- Invited Speech, Guilin University of Electronic Technology, 2020
- Reviewer, IEEE UFFC outstanding paper 2016-2019

## AWARDS

- **优秀创新创业导师**, **第五届中国“互联网+”大学生创新创业大赛**, 2019

## CURRENT GROUP MEMBERS

**Ph.D.**
ALI SIDDIQUE, 2019
LIU SHUAIQI, 2018
WANG PANKE, 2015
WANG JIUJIANG, 2012
ZHANG SHUANG, 2011

**M.Sc.**
MA XIANGXI, 2021
FAN SHAOCAN, 2017
ZHAN YI, 2017

**POST-DOC./R.A.**
YU YUANYU, 2019

## SELECTED PUBLICATIONS

- H Wu, Y Gao, J Yang, M Vai, M Du, S Pun, “Development of a Photoelectric Adjustment System With Extended Range for Fluorescence Immunochromatographic Assay Strip Readers,” IEEE Photonics Journal, vol. 13, Jun. 2021.
- X Yang, P Sun, J Wu, W Jiang, M Vai, S Pun, C Peng, F Chen, “Nondestructive and objective assessment of the vestibular function in rodent models: A review,” Neuroscience letters, vol. 717, pp. 134608, Jan, 2020.
- L Shao, S Liu, S Bandyopadhyay, F Yu, W Xu, C Wang, H Li, M Vai, L Du, J Zhang, “Data-driven distributed optical vibration sensors: a review,” IEEE Sensors Journal, vol. 20, pp. 6224-6239, Sep. 2019.
- P Sun, Y Zhang, F Zhao, J Wu, S Pun, C Peng, M Du, M Vai, D Liu, F Chen, “An assay for systematically quantifying the vestibulo-ocular reflex to assess vestibular function in zebrafish larvae,” vol. 12, Aug, 2018.
- X Chen, S Barma, S Pun, M Vai, P Mak, “Direct measurement of elbow joint angle using galvanic couple system,” IEEE Transactions on Instrumentation and Measurement, vol. 66, Feb, 2017.

**Sio Hang Pun (Lodge)**
**Associate Professor, , IEEE Senior Member**
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## RESEARCH INTERESTS

Biomedical electronics
Neuroscience application
Capacitive Micro-machined Ultrasonic Transducers
Bio-electromagnetism
Intra-body communication

## PROFESSIONAL SERVICES

- Chair, IEEE Engineering on Biology and Medicine Engineering Society (EMBS) Hong Kong and Macau Joint Chapter, 2013
- Executive Committee member, IEEE Engineering on Biology and Medicine Engineering Society (EMBS) Hong Kong and Macau Joint Chapter, 2012-Present
- Member, Asia-Pacific work group, International Federation of Medical and Biological Engineering (IFMBE), 2019-present
- Member, APCMBE steering committee (International organization committee), 2020
- Reviewer, IEEE Transaction on Biomedical Engineering
- Reviewer, IEEE Transactions on Ultrasonic, Ferroelectric, and Frequency Control
- Reviewer, IEEE Journal on Biomedical and Health Informatics
- Reviewer, IEEE Engineering on Biology and Medicine Engineering Conference (EMBC), 2009-Present

## AWARDS

- Invited Keynote Speaker, ICQCA 2021: International Conference on Quantum Computing and Algorithms

## CURRENT GROUP MEMBERS

**Ph.D.**
Benzheng Li, 2017
Cheng Li, 2017
Mingtao Li, 2018
Ali Siddique, 2019 (co-supervisor)
WeiHao Lin, 2019 (co-supervisor)
Peng Sun, 2017 (co-supervisor)

**M.Sc.**
JieYu Ma, 2020
Hong Liang Loo, 2020
U Tok Cheong, 2019
U Kin Che, 2017
LiYang Wang, 2017

**POST-DOC./R.A.**
ChangHao Chen 2019
YuanYu Yu, 2020
JiuJiang Wang, 2020

## SELECTED PUBLICATIONS

- H.Wu et al., "Development of a Photoelectric Adjustment System With Extended Range for Fluorescence Immunochromatographic Assay Strip Readers," IEEE Photonics J., vol. 13, no. 3, pp. 1–12, 2021.
- Y.Yu et al., "Experimental Characterization of an Embossed Capacitive Micromachined Ultrasonic Transducer Cell," Micromachines, vol. 11, no. 2, p. 217, Feb.2020, 10.3390/mi11020217.
- P. K.Wang et al., "Low-latency single channel real-time neural spike sorting system based on template matching," PLoS One, vol. 14, no. 11, p. e0225138, 2019.
- S.Zhang et al., "Experimental Verifications of Low Frequency Path Gain (PG) Channel Modeling for Implantable Medical Device (IMD)," IEEE Access, vol.7 , pp. 11934–11945, 2019, 10.1109/ACCESS.2019.2892130.
- Z. Mohammadi et al., "Computationally inexpensive enhanced growing neural gas algorithm for real-time adaptive neural spike clustering," J. Neural Eng., vol. 16, no. 5, pp. 1–18, 2019, 10.1088/1741-2552/ab208c.
- S. H.Pun et al., "Monolithic Multiband CMUTs for Photoacoustic Computed Tomography with In Vivo Biological Tissue Imaging," IEEE Trans. Ultrason. Ferroelectr. Freq. Control, vol. 65, no. 3, pp. 465–475, 2018.
- Y.Yu et al., "Design of a Collapse-Mode CMUT with an Embossed Membrane for Improving Output Pressure," IEEE Trans. Ultrason. Ferroelectr. Freq. Control, 2016, 10.1109/TUFFC.2016.2554612.
- C. H.Chen et al., "An Integrated Circuit for Simultaneous Extracellular Electrophysiology Recording and Optogenetic Neural Manipulation," IEEE Trans. Biomed. Eng., vol. 64, no. 3, pp. 557–568, 2017, 10.1109/TBME.2016.2609412.

**Chi-Seng Lam (Terence)**
**Associate Professor, IEEE Senior Member**
**Member, Microelectronics Education Committee,**
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## RESEARCH INTERESTS

Power Management Integrated Circuits
Wireless Power Transfer
Power Converters
Power Quality Compensators
Renewable Energy Generation Systems

## PROFESSIONAL SERVICES

- Vice-Chair, IEEE Macau Section 2016-2020
- Chair, IEEE Macau IES Chapter 2019-Present
- Chair, IEEE Macau CAS & COM Joint Chapter 2017-2018
- Vice-Chair, IEEE Macau PES & PELS Chapter 2020-Present
- Associate Editor, IEEE TIE 2020-Present
- Associate Editor, IEEE OJES 2020-Present
- Associate Editor, IEEE Access 2020-Present
- Guest Editor, IEEE TCAS-II 2020-2021
- Guest Editor, IET PEL 2020-2021
- Tutorial Speaker, IEEE ISCAS 2021
- Tutorial Speaker, IEEE IECON 2020
- Tutorial Speaker, IEEE APPEEC 2019
- Chair, IEEE IES PETC Power Quality Subcommittee 2020-Present
- TC Member, IEEE IES ESOC 2019-Present
- TC Member, IEEE IES RES 2019-Present
- TC Member, IEEE CAS PECAS 2019-Present

## AWARDS

- Macao Science & Technology Invention Awards'14'18
- IEEE PES Chapter Outstanding Engineer Award'17
- Best Track Paper Award, IEEE PES APPEEC'19
- Best Paper Award, IEEE ICTA'19
- Macao Science & Technology Award for Postgraduates' 12
- IIM Young Research Award'20 (as advisor)
- Silver Award, The 6th China International University Students' "Internet +" Innovation and Entrepreneurship Competition (as advisor)

## CURRENT GROUP MEMBERS

**Ph.D.**
Cheng Gong, 2018
Junwei Huang, 2018
Wai-Kit Sou, 2019
Chi-Wa U, 2019
Caolei Pan, 2019
Io-Wa Iam, 2020

**M.Sc.**
Sibo Wen, 2019
Lei Xuan, 2019
Iok-U Hoi, 2020
Cong Liu, 2020
Chio-Kuan Choi, 2020

**POST-DOC./R.A.**
Wen-Liang Zeng, 2020

## SELECTED PUBLICATIONS

- Zhicong Huang, Chi-Seng Lam, Pui-In Mak, Rui P. Martins, Siu-Chung Wong, and Chi K. Tse, "A single-stage inductive-power-transfer converter for constant-power and maximum-efficiency battery charging" IEEE Transactions on Power Electronics (TPEL), vol. 35, no. 9, pp. 8973 – 8984, Sept. 2020.

- Wen-Liang Zeng, Yuan Ren, Chi-Seng Lam, Sai-Weng Sin, Weng-Keong Che, Ran Ding, Rui P. Martins, "A 470-nA quiescent current and 92.7%/94.7% efficiency DCT/PWM control buck converter with seamless mode selection for IoT application", IEEE Transactions on Circuits and Systems I - Regular Papers (TCAS-I), vol. 67, no. 11, pp. 4085 – 4098, Nov. 2020.

- Wen-Liang Zeng, Chi-Seng Lam, Sai-Weng Sin, Franco Maloberti, Man-Chung Wong, Rui P. Martins, "A 220-MHZ bondwire-based fully-integrated KY converter with fast transient response under DCM operation", IEEE Transactions on Circuits and Systems I - Regular Papers (TCAS-I), vol. 65, no. 11, pp. 3984 – 3995, Nov. 2018.

- Lei Wang, Chi-Seng Lam, Man-Chung Wong, "Analysis, control, and design of a hybrid grid-connected inverter for renewable energy generation with power quality conditioning", IEEE Transactions on Power Electronics (TPEL), vol. 33, no. 8, pp. 6755 – 6768, Aug. 2018.

- Chi-Seng Lam, Lei Wang, Sut-Ian Ho, Man-Chung Wong, "Adaptive thyristor controlled LC – hybrid active power filter for reactive power and current harmonics compensation with switching loss reduction," IEEE Transactions on Power Electronics (TPEL), vol. 32, no. 10, pp. 7577 – 7590, Oct. 2017.

**Jun Yin (Kevin)**
**Associate Professor, IEEE Member**
**Member, Industrial Collaboration and Microelectronics Center/ZUMRI, Institute of Microelectronics**

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## RESEARCH INTERESTS

Frequency Generation Circuits
Low-Power Wireless Transceivers for IoT Application

## PROFESSIONAL SERVICES

- Associate Editor, IEEE TCAS-I 2020-Present
- Associate Editor, ELSEVIER Integration the VLSI Journal
- TPC Member, IEEE ISSCC 2022-Present
- TPC Member, IEEE ESSCIRC 2020-Present
- TPC Member, IEEE A-SSCC 2019, 2021-Present
- TPC Member, IEEE ISCAS 2017-Present
- TPC Member, IEEE ICTA 2019-Present

## AWARDS

- Macao Science & Technology Invention Awards'18'20
- IEEE SSCS Pre-Doctoral Achievement Awards '19 (as advisor)
- IEEE CICC Student Scholarship Award'12

## CURRENT GROUP MEMBERS

**Ph.D.**
Xi Meng, 2018
Jiaji Mao, 2019
Tailong Xu, 2019
Zhizhan Yang, 2019
Xiaoqi Lin, 2019
Jiang Yang, 2019
Xiangxun Zhan, 2020
Haoran Li, 2020
Qiyao Jiang, 2020

**M.Sc.**
Bolun Su, 2018
Shenke Zhong, 2019
Tianxiao Xie, 2019

## SELECTED PUBLICATIONS

- C. Fan, J. Yin, C. -C. Lim, P. -I. Mak, and R. P. Martins, "A 9mW 54.9-to-63.5GHz Current-Reuse LO Generator with a 186.7dBc/Hz FoM by Unifying a 20GHz 3rd-Harmonic-Rich Current-Output VCO, a Harmonic-Current Filter and a 60GHz TIA," IEEE International Solid-State Circuit Conference (ISSCC), Feb. 2020.

- S. Yang, J. Yin, H. Yi, W. -H. Yu, P. -I. Mak, and R. P. Martins, "A 0.2-V Energy-Harvesting BLE Transmitter with a Micropower Manager Achieving 25% System Efficiency at 0-dBm Output and 5.2-nW Sleep Power in 28-nm CMOS," IEEE Journal of Solid-State Circuits (JSSC), vol. 54, May. 2019. [Also in ISSCC 2018]

- S. Yang, J. Yin, P. -I. Mak, and R. P. Martins, "A 0.0056-mm² -249-dB-FoM All-Digital MDLL Using a Block-Sharing Offset-Free Frequency-Tracking Loop and Dual Multiplexed-Ring VCOs," IEEE Journal of Solid-State Circuits (JSSC), vol. 54, Jan. 2019. [Also in ISSCC 2018]

- C. -C. Lim, H. Ramiah, J. Yin, P. –I. Mak, and R. P. Martins, "An Inverse-Class-F CMOS Oscillator With Intrinsic-High-Q First Harmonic and Second Harmonic Resonances," IEEE Journal of Solid-State Circuits (JSSC), vol. 53, Dec. 2018. [Also in ISSCC 2018]

- Y. Peng, J. Yin, P. -I. Mak, and R. P. Martins, "Low-Phase-Noise Wideband Mode-Switching Quad-Core-Coupled mm-wave VCO Using a Single-Center-Tapped Switched Inductor," IEEE Journal of Solid-State Circuits (JSSC), vol. 53, Nov. 2018.

- X. Peng, J. Yin, P. -I. Mak, W. -H. Yu, and R. P. Martins, "A 2.4-GHz ZigBee Transmitter Using a Function-Reuse Class-F DCO-PA and an ADPLL Achieving 22.6% (14.5%) System Efficiency at 6-dBm (0-dBm) Pout," IEEE Journal of Solid-State Circuits (JSSC), vol. 52, Jun. 2017.

- J. Yin, P.-I. Mak, F. Maloberti, and R. P. Martins, "A Time-Interleaved Ring-VCO with Reduced 1/f³ Phase Noise Corner, Extended Tuning Range and Inherent Divided Output," IEEE Journal of Solid-State Circuits (JSSC), vol. 51, Dec. 2016. [Also in ISSCC 2016]

**Chi-Hang Chan (Ivor)**
**Assistant Professor, IEEE Member**
**Member, Industrial Collaboration and Microelectronics Center/ZUMRI, Institute of Microelectronics**

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## RESEARCH INTERESTS

Noise-shaping SAR ADCs
Wideband Sigma Delta Modulators
Low Jitter Ring-VCO-based PLL
High-Speed ADCs
Hybrid ADCs
Mixed-Signal Circuits
Time-Domain Integrated Circuits

## PROFESSIONAL SERVICES

- Reviewer of IEEE JSSC, SSCL, TCAS-I, TCAS-II, TVLSI, Access, etc.

## CURRENT GROUP MEMBERS

- **Ph.D.**
  Kai Xing
  Hongshuai Zhang
  Zehang Wu
  Yuanzhe Zhao
- **M.Sc.**
  Sifan Wang
  Chaorui Zou
- **POST-DOC./R.A.**
  Jiang Wenning
  Yanbo Zhang
  Junyan Hao
  Zhang Yanna
  Zhang Hongzhi

## SELECTED PUBLICATIONS

- Z. Zheng et al., "16.3 A Single-Channel 5.5mW 3.3GS/s 6b Fully Dynamic Pipelined ADC with Post-Amplification Residue Generation," 2020 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2020, pp. 254-256.
- M. Zhang, Y. Zhu, C. H. Chan, and R. P. Martins, "A 8-bit 10-GS/s 16× interpolation-based time-domain ADC with <1.5-ps uncalibrated quantization steps," IEEE Journal of Solid-State Circuits, vol. 55, no. 12, pp. 3225-3235, Dec. 2020.
- Y. Song, Y. Zhu, C. H. Chan and R. P. Martins, "9.6 A 2.56mW 40MHz-Bandwidth 75dB-SNDR Partial-Interleaving SAR-Assisted NS Pipeline ADC With Background Inter-Stage Offset Calibration," 2020 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2020, pp. 164-166.
- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6-V 13-bit 20-MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE Journal of Solid-State Circuits, vol. 54, no. 12, pp. 3396-3408, Dec. 2019.
- X. Yang, C. Chan, Y. Zhu and R. P. Martins, "16.3 A −246dB Jitter-FoM 2.4GHz Calibration-Free Ring-Oscillator PLL Achieving 9% Jitter Variation Over PVT," 2019 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2019, pp. 260-262.
- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 4× interleaved 10GS/s 8b time-domain ADC with 16× interpolation-based inter-stage gain achieving >37.5dB SNDR at 18GHz input," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2020, pp. 252-253.
- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6V 13b 20MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2019, pp. 66-67.
- W. Jiang, Y. Zhu, M. Zhang, C. Chan and R. P. Martins, "3.2 A 7.6mW 1GS/s 60dB SNDR Single-Channel SAR-Assisted Pipelined ADC with Temperature-Compensated Dynamic Gm-R-Based Amplifier," 2019 IEEE International Solid- State Circuits Conference - (ISSCC), San Francisco, CA, USA, 2019, pp. 60-62.

**Yanwei Jia**
**Assistant Professor**
**Member, Lab Infrastructure and Testing Facilities Committee, Institute of Microelectronics**

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## RESEARCH INTERESTS

Digital Microfluidics Technology development
Novel Techniques for Disease Diagnostics
Digital Microfluidics for Precision Medicine
Drug Screening in Digital Microfluidics

## PROFESSIONAL SERVICES

- Reviewers for the prestigious journals:
- Lab on a Chip
- Chemical Science
- ACS Applied Materials and Interfaces
- ACS Sensors
- Analytical Chemistry
- ChemComm
- Talanta
- Langmuir
- Micromachines
- Biomicrofluidics
- Microchimica Acta
- Microfluidics and Nanofluidics
- Rection Chemistry and Engineering
- Sensors

## AWARDS

- Innovation Award, The 9th International Multidisciplinary Conference on Optofluidics, 2019

## GRADUATED STUDENTS

**Ph.D.**
Ren Shen, 2021
Haoran Li, 2021

**M.Sc.**
Yujun Mao, 2021

## CURRENT GROUP MEMBERS

**Ph.D.**
Liang Wan
Sizhe Dong
Bingyang Ye

**M.Sc.**
Wenjun Miao

**POST-DOC./R.A.**
Xiaojun Chen
Meiqing Liu
Yingying Liu
Caiwei Li

## SELECTED PUBLICATIONS

- H. R. Li, R. Shen, Y. W. Jia*, P. I. Mak, R. P. Martins, Turning on/off satellite droplet ejection for flexible sample delivery on digital microfluidics, Lab on a Chip, 20,3709-3719, 2020 (Inside Front Cover).

- R. Shen, Y. W. Jia*, P. I. Mak, and R. P. Martins, Clip to release on amplification (CRoA): a novel enhancer for DNA amplification on and off microfluidics, Lab on a Chip, 20, 1928-1938, 2020 (Outside Back Cover).

- J. Zhai, H. R. Li, A. H. H. Wong, C. Dong, S. H. Yi, Y. W. Jia*, P. I. Mak, C. X. Deng and R. P. Martins, A digital microfluidic system with 3D microstructures for single-cell culture, Microsystems and Nanoengineering, 6, 6, 2020.

- J. Zhai, S. H. Yi, Y. W. Jia*, P. I. Mak, R. P. Martins, Cell-based drug screening on microfluidics, Trends in Analytical Chemistry, 117, 231-241, 2019.

- M. Z. Li, C. Dong, M. K. Law*, Y. W. Jia*, P. I. Mak and R. P. Martins, Hydrodynamic-flow-enhanced rapid mixer for isothermal DNA hybridization kinetics analysis on digital microfluidics platform, Sensors and Actuators B, 287, 390-397, 2019.

- C. Dong, Y. W. Jia*, J. Gao, T. L. Chen, P. I. Mak, M. I. Vai and R. P. Martins, A 3D microblade structure for precise and parallel droplet splitting on digital microfluidic chips, Lab on a Chip, 17, 896-904, 2017.

**Yong Chen (Nick)**
**Assistant Professor, IEEE Senior Member**
**Member, Industrial Collaboration and Microelectronics Center/ZUMRI, Institute of Microelectronics**

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## RESEARCH INTERESTS

High-speed wireline communication for electrical and optical interconnects
RF/mm-wave/sub-THz communication systems and circuits
Analog/mixed-signal CMOS integrated circuits

## PROFESSIONAL SERVICES

- Associate Editor of IEEE TVLSI (2019-present)
- Associate Editor of IEEE Access (2019-present)
- Associate Editor of IET EL (2020-present)
- Editor of IJCTA (2020-present)
- Guest Editor of IEEE TCAS-II (ISCAS'2021, ISICAS'2021)
- Vice Chair (2019-2021) and Chair (2021-2023) of IEEE Macau CAS Chapter
- Technical Committee of IEEE CASCOM (2020-present)
- Review Committee Member of ISCAS'2021
- TPC Co-Chair of ICCS'2021
- Tutorial Chair of ICCS'2020
- Advisory Committee of APCCAS'2021
- Local Organization Committee of A-SSCC'2019
- Track Chair of A-SSCC'2021, ICTA'2021, ISCAS'2021, APCCAS'2020, APCCAS'2019
- TPC of A-SSCC'2021-present
- TPC of ICECS'2021-present
- TPC of APCCAS'2019-present
- TPC of NorCAS'2020-present
- TPC of ICTA'2020-present
- TPC of ICSICT'2020

## AWARDS

- Macao Science and Technology Invention Award'20 (First Prize)
- Best Student Paper Award (Third Place) in the IEEE Radio Frequency Integrated Circuits (RFIC 2021) Symposium
- Top five Associate Editors of IEEE Transaction on Very Large Scale Integration (TVLSI) Systems in 2020
- Best Paper Award in the IEEE Asia Pacific Conference on Circuits and Systems (APCCAS 2019)
- "Haixi" (three places across the Straits) postgraduate integrated circuit design competition (Second Prize) in 2009

## CURRENT GROUP MEMBERS

**Ph.D. student**
Yunbo Huang, 2018
Lin Wang, 2019
Chaowei Yang, 2020
Kai Cheng, 2020
Yue Wu, 2021

**M.Sc.**
Mei Han, 2019
Gao Zhang, 2020
Bofu Su, 2020
Xionghui Zhou, 2021

**POST-DOC./R.A.**
Xiaoteng Zhao, 2017
Hao Guo, 2017

## SELECTED PUBLICATIONS

- X. Zhao, Y. Chen, P.-I. Mak, and R. P. Martins, "A 0.0285-mm² 0.68-pJ/bit single-loop full-rate bang-bang CDR without reference and separate FD pulling off an 8.2(Gb/s)/μs acquisition speed of PAM-4 input in 28-nm CMOS," IEEE Journal of Solid-State Circuits (JSSC), vol. xx, no. xx, pp. xxxx-xxxx, xxx. 2021. [In press]

- H. Guo, Y. Chen, P.-I. Mak, and R. P. Martins, "A 5.0-to-6.36GHz wideband-harmonic-shaping VCO achieving 196.9dBc/Hz peak FOM and 90-to-180kHz 1/f³ PN corner without harmonic tuning," IEEE International Solid-State Circuits Conference (ISSCC), pp. 294-296, Feb. 2021.

- H. Guo, Y. Chen, P.-I. Mak, and R. P. Martins, "A 0.08 mm² 25.5-to-29.9GHz multi-resonant-RLCM-tank VCO using a single-turn multi-tap inductor and CM-only capacitors achieving 191.6-dBc/Hz FOM and 130kHz 1/f³ PN corner," IEEE International Solid-State Circuits Conference (ISSCC), pp. 410-412, Feb. 2019.

- Z. Yang, Y. Chen, S. Yang, P.-I. Mak, and R. P. Martins, "A 25.4-to-29.5GHz 10.2mW isolated-sub-sampling PLL (iSS-PLL) achieving -252.9dB jitter-power FOM and -63 dBc reference spur," IEEE International Solid-State Circuits Conference (ISSCC), pp. 270- 272, Feb. 2019.

- Y. Chen, P.-I. Mak, H. Yu, C. C. Boon, and R. P. Martins, "An area-efficient and tunable band width-extension technique for a wideband CMOS amplifier handling 50+ Gb/s signaling," IEEE Transactions on Microwave Theory and Techniques (TMTT), vol. 65, no. 12, pp. 4960-4975, Dec. 2017.

**Ka-Fai Un (Keith)**
**Assistant Professor, IEEE Member**
**Secretary, Pedagogic Committee,**
**Institute of Microelectronics**
**Member, Microelectronics Education Committee,**
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## RESEARCH INTERESTS

Wideband analog transmitter
MIMO transmitter
Digital transmitter
Multi-phase local oscillator generation
Digital phase-locked loop
Switched-capacitor circuit
Ultra-low power analog neural network-based classifier
In-memory-computation for artificial intelligence
Convolutional neural network digital accelerator

## PROFESSIONAL SERVICES

- Secretary of IEEE CASS Macau Chapter
- Reviewer of IEEE JSSC, T-CAS I/II, Access, ISCAS, etc

## AWARDS

- IEEE (Macau Chapter) Project Competition Champion'21 (co-supervisor)
- Synopsys Microelectronics Award'14
- PhD student recipient of Postgraduate Science and Technology Research and Development Award'12
- Merit Student Paper in Asia Pacific Conference on Circuits and Systems'08
- Presidential award, National Taiwan University'04
- Macau Representative for International Mathematics Olympiad'03
- Macau Representative for Chinese Mathematics Olympiad'03

## CURRENT GROUP MEMBERS

**Ph.D.**
Yuzhao Fu, 2020
Jixuan Li, 2019
Feifei Chen, 2018 (co-supervisor)
Ran Zhang, 2019 (co-supervisor)

**M.Sc.**
Jinhai Lin, 2020
Jiabao, Chen, 2020
Lei Xuan, 2019 (co-supervisor)

## SELECTED PUBLICATIONS

- K. -F. Un, F. Zhang, P. -I. Mak, R. P. Martins, A. Zhu and R. Staszewski, "Design Considerations of the Interpolative Digital Transmitter for Quantization Noise and Replicas Rejection," IEEE Transactions on Circuits and Systems II: Express Briefs, vol. 67, no. 1, pp. 37-41, Jan. 2020.
- K. -F. Un, G. Qi, J. Yin,; S. Yang, S. Yu, C.-I. Ieong, P.-I. Mak, R. P. Martins, "A 0.12-mm² 1.2-to-2.4-mW 1.3-to-2.65-GHz Fractional-N Bang-Bang Digital PLL With 8-µs Settling Time for Multi-ISM-Band ULP Radios," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 66, no. 9, pp. 3307-3316, Sept. 2019
- W. Yu, K. Un, P. Mak and R. P. Martins, "A 0.7–2.5 GHz, 61% EIRP System Efficiency, Four-Element MIMO TX System Exploiting Integrated Power-Relaxed Power Amplifiers and an Analog Spatial De-Interleaver," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 65, no. 1, pp. 14-25, Jan. 2018.
- K. Un, W. Yu, C. Cheang, G. Qi, P. Mak and R. P. Martins, "A Sub-GHz Wireless Transmitter Utilizing a Multi-Class-Linearized PA and Time-Domain Wideband-Auto I/Q-LOFT Calibration for IEEE 802.11af WLAN," IEEE Transactions on Microwave Theory and Techniques, vol. 63, no. 10, pp. 3228-3241, Oct. 2015.
- K.-F. Un, P.-I. Mak, and R. P. Martins, "A 53-to75-mW, 59.3-dB HRR, TV-Band White-Space Transmitter using a Low-Frequency Reference LO in 65-nm CMOS," IEEE Journal of Solid-State Circuits, vol. 48, no.8, pp. 2078-2089, Sep. 2013.

**Mo Huang**
**Assistant Professor, IEEE Senior Member**
**Member, Industrial Collaboration and Microelectronics Center/ZUMRI, Institute of Microelectronics**

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## RESEARCH INTERESTS

DC-DC Converters
GaN Drivers
Wireless power transfer and energy harvesting
Analog and mixed-signal IC design

## PROFESSIONAL SERVICES

- Associate Editor, Microelectronic Journals, 2021
- TPC Member, IEEE VLSI-DAT, 2021
- TPC Member, IEEE ICESC, 2020
- TPC Member, APCCAS 2018
- TPC Member, ICTA 2017, 2021
- TPC Member, ASICON 2017
- Reviewer of IEEE JSSC, TPE, TCAS-I, TCAS-II, TVLSI, EL, etc.

## AWARDS

- IEEE ISSCC Takuo Sugano Award'17
- IEEE TENCON Professional Award'15

## CURRENT GROUP MEMBERS

**Ph.D.**
Tingxu Hu, 2020
Qiujin Chen, 2020

**M.Sc.**
Yunzhe Yang, 2020
Zihan Yang, 2020

**POST-DOC./R.A.**
Jian Liu, 2020
Jinxu Xu, 2020
Yuanfei Wang, 2021

## SELECTED PUBLICATIONS

- M. Huang, Y. Lu, T. Hu, and R. P. Martins, "A Hybrid Boost Converter With Cross-Connected Flying Capacitors," IEEE Journal of Solid-State Circuits (JSSC), vol. 56, no. 7, pp. 2102–2112, Jul. 2021. [Also in ISSCC 2020].

- T. Hu, M. Huang, Y. Lu, X. Y. Zhang, F. Maloberti, and R. P. Martins, "A 2.4-GHz CMOS Differential Class-DE Rectifier with Coupled Inductors," IEEE Transactions on Power Electronics (TPE), access for publication .

- M. Huang, Y. Lu, and R. P. Martins, "An Analog-Proportional Digital-Integral Multiloop Digital LDO With PSR Improvement and LCO Reduction," IEEE Journal of Solid-State Circuits (JSSC), vol. 55, no. 6, pp. 1637–1650, Jun. 2020 [Also in CICC 2019].

- M. Huang et al., "Single- and Dual-Band RF Rectifiers with Extended Input Power Range Using Automatic Impedance Transforming," IEEE Transactions on Microwave Theory and Techniques (TMTT), vol. 67, no. 5, pp. 1974–1984, May 2019.

- M. Huang, Y. Lu, S. U, and R. P. Martins, "An Analog-Assisted Tri-Loop Digital Low-Dropout Regulator," IEEE Journal of Solid-State Circuits (JSSC), vol. 53, no. 1, pp. 20–34, Jan. 2018 [Also in ISSCC 2017].

- M. Huang, Y. Lu, and R. P. Martins, "A Reconfigurable Bidirectional Wireless Power Transceiver for Battery-to-Battery Wireless Charging," IEEE Transactions on Power Electronics (TPE), vol. 34, no. 8, pp. 7745–7753, Aug. 2019 [Also in ISSCC 2017].

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## EDUCATION

PhD, ECE, University of Macau, 2016
BS, EEE, University of Macau, 2012

## EXPERIENCES

- Assistant Professor, University of Macau, Macau, Sept. 2019 - present
- Visiting scholar, Harvard University, Cambridge, MA, Jun. 2017 – Aug. 2019
- Lecturer (UM Macao Fellow), University of Macau, Macau, Dec. 2016 – Aug. 2019
- Research assistant, University of Macau, Macau, Sept. 2012 – Nov. 2016
- Trainee, Evatronix SA, Poland, Jun. 2012 – Jul. 2012

## RESEARCH INTERESTS

Analog and RF circuit techniques for micro-NMR
Sensors and analog front-end interfaces
System planning and integration for biomedical devices
Ultra-low-power and ultra-low-voltage IC design

## PROFESSIONAL SERVICES

- Demo Session Chair, IEEE ICECS 2019
- Organizing Committee, IEEE A-SSCC 2019
- YP Committee member, IEEE SSCS, 2020 – present
- TPC Member, IEEE ICTA 2021

## AWARDS

- IEEE Solid-State Circuits Society - Pre-Doctoral Achievement Award 2017
- FDCT Macao Science and Technology Award for Postgraduates2016 (Ph.D. level)
- IEEE international Solid-State Circuits Conference - Silkroad Award 2016
- IEEE Asian Solid-State Circuits Conference - Distinguished Design Award 2015
- Chemical and Biological Microsystems Society - Student/Young Researcher Grant 2015
- Asia Symposium on Quality Electronic Design – Best Paper Award 2013

## CURRENT GROUP MEMBERS

**Ph.D.**
Liwen Lin, 2019 (co-supervisor)
Shuhao Fan, 2019
Rui Luo, 2020
Qi Zhou, 2020
Dan Shi, 2021
Haihua Li, 2021

**M.Sc.**
Kanghong Yu, 2020
Hengchen Zou, 2020
Chengyu Che, 2021

## SELECTED PUBLICATIONS

- K.-M. Lei, P.-I. Mak, and R. P. Martins, "A 0.35-V 5,200-µm2 2.1-MHz Temperature-Resilient Relaxation Oscillator with 667fJ/cycle Energy Efficiency Using an Asymmetric Swing-Boosted RC Network and a Dual-Path Comparator," IEEE J. Solid-State Circuits, Early access, 2021.
- K.-M. Lei, P.-I. Mak, and R. P. Martins, "Startup time and energy-reduction techniques for crystal oscillators in the IoT era," IEEE Transactions on Circuits and System II - Express Briefs, vol. 68, no. 1, pp. 30-35, Jan. 2021.
- K.-M. Lei, D. Ha, Y.-Q. Song, R. M. Westervelt, R. P. Martins, P.-I. Mak, and D. Ham, "Portable NMR with parallelism," Analytical Chemistry, vol. 92, no. 2, pp. 2112-2120, Jan. 2020.
- A. Dupré*, K.-M. Lei*, P.-I. Mak, R. P. Martins, and W. K. Peng, "Micro- and nanofabrication NMR technologies for point-of-care medical applications – A review," Microelectronic Engineering, vol. 209, pp. 66-74, Mar. 2019.
- K.-M. Lei, P.-I. Mak, M.-K. Law, and R. P. Martins, "A regulation-free sub-0.5-V 16-/24-MHz crystal oscillator with 14.2-nJ startup energy and 31.8-µW steady-state power," IEEE J. Solid-State Circuits, vol. 53, no. 9, pp. 2624-2635, Sept. 2018 [Also in ISSCC 2018].
- K.-M. Lei, H. Heidari, P.-I. Mak, M.-K. Law, F. Maloberti and R. P. Martins, "A Handheld High-Sensitivity Micro-NMR CMOS Platform with B-Field Stabilization for Multi-Type Biological/Chemical Assays," IEEE Journal of Solid-State Circuits, vol. 52, Jan. 2017. [Also in ISSCC 2016]

**Minglei Zhang**
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## RESEARCH INTERESTS

High-Speed ADCs
Hybrid ADCs
ADC-based Optical Receiver
Mixed-Signal Computing
Time-Domain Integrated Circuits

## PROFESSIONAL SERVICES

- Reviewer of IEEE JSSC, SSCL, TCAS-I, TCAS-II, TVLSI, TPE, Sensor Journal, Access, etc.

## CURRENT GROUP MEMBERS

**Ph.D.**
Zehang Wu, 2020 (co-supervisor)

**M.Sc.**
Chaorui Zou, 2020 (co-supervisor)

## SELECTED PUBLICATIONS

- M. Zhang, Y. Zhu, C. H. Chan, and R. P. Martins, "A 8-bit 10-GS/s 16× interpolation-based time-domain ADC with <1.5-ps uncalibrated quantization steps," IEEE Journal of Solid-State Circuits, vol. 55, no. 12, pp. 3225-3235, Dec. 2020.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6-V 13-bit 20-MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE Journal of Solid-State Circuits, vol. 54, no. 12, pp. 3396-3408, Dec. 2019.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 4× interleaved 10GS/s 8b time-domain ADC with 16× interpolation-based inter-stage gain achieving >37.5dB SNDR at 18GHz input," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2020, pp. 252-253.

- M. Zhang, C. H. Chan, Y. Zhu, and R. P. Martins, "A 0.6V 13b 20MS/s two-step TDC-assisted SAR ADC with PVT tracking and speed enhanced techniques," IEEE International Solid-State Circuits Conference (ISSCC), Feb. 2019, pp. 66-67.

**Yang Jiang (Tim)**
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## RESEARCH INTERESTS

- Integrated Power Converters
- Power/Sensor Device Drivers
- Power Management for Energy Harvesting

## PROFESSIONAL SERVICES

- Member of Power and Energy Circuits and Systems Technical Committee (PECAS), IEEE CASS
- TPC and RC Member of IEEE ICECS, 2020
- Review Committee Member of IEEE APCCAS, 2019
- Peer Reviewer of:
  - IEEE Journal of Solid State Circuits (JSSC)
  - IEEE Solid-State Circuits Letters (SSC-L)
  - IEEE Transactions on Circuits and Systems I: Regular Papers (TCAS-I)
  - IEEE Transactions on Circuits and Systems II: Express Briefs (TCAS-II)
  - IEEE Transactions on Computer-Aided Design of Integrated Circuits and Systems (TCAD)
  - IEEE Access
  - Microelectronics Journal
  - IEICE Electronics Express
  - IEEE ISCAS, ICECS, APCCAS, BioCAS, ASQED…

## AWARDS

- IEEE Solid-State Circuits Society Pre-Doctoral Achievement Award 2018-2019
- Macau FDCT Scientific and Technological R&D Award for Postgraduates, 2020 (Ph.D. class)

## CURRENT GROUP MEMBERS

**Ph.D.**
Feiyu Li, 2021
Guangshu Zhao, 2019 (co-supervisor)

**M.Phil./M.Sc.**
Qiaobo Ma, 2020
Xiongjie Zhang, 2020
Ruijie Zhao, 2020
Huihua Li, 2021
Xuchu Mu, 2021

## SELECTED PUBLICATIONS

- Y. Jiang, M. K. Law, P. I. Mak and R. P. Martins, "Algebraic Series-Parallel-Based Switched-Capacitor DC-DC Boost Converter with Wide Input Voltage Range and Enhanced Power Density," IEEE J. Solid-State Circuits (JSSC), vol. 54, no. 11, pp. 3118-3134, Nov. 2019.

- Y. Jiang, M. K. Law, P. I. Mak and R. P. Martins, "Algorithmic Voltage-Feed-In Topology for Fully Integrated Fine-Grained Rational Buck-Boost Switched-Capacitor DC-DC Converters," IEEE J. Solid-State Circuits (JSSC), vol. 53, no. 12, pp. 3455-3469, Dec. 2018. [Also in ISSCC'18]

- J. Wu, K.-C. Lei, H.-M. Leong, Y. Jiang*, M.-K. Law, P.-I. Mak, and R. P. Martins, "Fully Integrated High Voltage Pulse Driver Using Switched-Capacitor Voltage Multiplier and Synchronous Charge Compensation in 65-nm CMOS," IEEE Trans. Circuits Syst. II Exp. Briefs, vol. 66, no. 10, pp. 1768-1772, Oct. 2019. (*Corresponding Author)

- J. Wu, H. -M. Leong, Y. Jiang*, M. -K. Law, P. -I. Mak and R. P. Martins, "A Fully Integrated 10-V Pulse Driver Using Multiband Pulse-Frequency Modulation in 65-nm CMOS," IEEE Trans. Very Large Scale Integr. (VLSI) Syst., vol. 29, no. 9, pp. 1665-1669, Sept. 2021. (*Corresponding Author)

- Y. Jiang, M. K. Law, P. I. Mak and R. P. Martins, "An Arithmetic Progression Switched-Capacitor DC-DC Converter with Soft VCR Transitions Achieving 93.7% Peak Efficiency and 400 mA Output Current," in IEEE Asian Solid-State Circuits Conference (A-SSCC), Nov. 2021.

**Wei-Han Yu (Hank)**
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## RESEARCH INTERESTS

Low-power IoT transceivers
Machine learning analog / digital accelerators
In-memory processing
Circuits for AI
MIMO wireless transceivers
Energy harvesting
Artificial retina
Switched-capacitor circuits
FPGA for AI

## PROFESSIONAL SERVICES

- Committee of IEEE SSCS Young Professional
- Reviewer of IEEE JSSC, T-CAS I/II, ISCAS, etc

## AWARDS

- IEEE (Macau Chapter) Project Competition Champion'21, supervisor
- IEEE Young Professionals Hall of Fame Award'20
- IEEE ISSCC SRP Poster Award (Honorable Mention)'19, co-author
- IEEE SSCS Pre-doctoral Achievement Award'18
- Synopsys Academic Prize, Synopsys (Macau)'18
- Macau Talent Award'18
- FDCT S&T Postgraduate Student Award'16
- IEEE ISSCC STGA Award'16
- CEM, ChipIdea and Ocean-Tech Prize'10
- Choi Kai Yau Scholarship'07
- FST Dean's Honor List, University of Macau'07

## SELECTED PUBLICATIONS

- W.-H. Yu, H. Yi, P.-I. Mak, J. Yin, R. P. Martins, "A 0.18V 382µW Bluetooth Low-Energy (BLE) Receiver with 1.33nW Sleep Power for Energy-Harvesting Applications in 28nm CMOS," IEEE International Solid-State Circuits Conference (ISSCC), Digest., pp. 414-415, Feb. 2017. [Chip Olympics] [ISSCC 2017 Technical Highlight]

- W.-H. Yu, M. Giordano, R. Doshi, M. Zhang, P.-I. Mak, R. P. Martins, and B. Murmann, "A 4-bit Mixed-Signal MAC Array with Swing Enhancement and Local Kernel Memory," IEEE International Midwest Symposium on Circuits and Systems, Aug. 2021.

- W.-H. Yu, K.-F. Un, P.-I. Mak and R. P. Martins, "A 0.7–2.5 GHz, 61% EIRP System Efficiency, Four-Element MIMO TX System Exploiting Integrated Power-Relaxed Power Amplifiers and an Analog Spatial De-Interleaver," IEEE Transactions on Circuits and Systems I: Regular Papers, vol. 65, no. 1, pp. 14-25, Jan. 2018.

- Chao Fan, Wei-Han Yu, Pui-In Mak, R. P. Martins, "A 40-Gb/s PAM-4 Transmitter Using a 0.16-pJ/bit SST-CML-Hybrid (SCH) Output Driver and a Hybrid-Path 3-Tap FFE Scheme in 28-nm CMOS," IEEE Transactions on Circuits and Systems I, vol. 66, pp. 4850–4861, Dec. 2019.