Patrick P. Mercier

Professor and Vice Chair, Electrical and Computer Engineering
Co-Director, Center for Wearable Sensors
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Professional Highlights

- Currently leading a ~20-person group undertaking high-impact research spanning multiple domains, from near-zero-power integrated circuits, power management, energy harvesting, neural interfaces, wearable physiochemical sensors, RFICs and RF systems, and beyond
- Over 220 peer-reviewed publications, including 30 *ISSCC* papers, 37 *JSSC* papers, and several papers in high-impact journals such as *Science, Nature Biotechnology, Nature Biomedical Engineering, Nature Electronics, Nature Communications, Advanced Science, Energy and Environmental Science*, and more
- Recognized as one of the top contributors of all time at the 2023 *IEEE International Solid-State Circuits Conference (ISSCC)*
- Co-founder and co-director of the successfully industry-supported UCSD Center for Wearable Sensors
- Site Director of the successfully industry/NSF-supported IUCRC Power Management Integration Center, partnered with Dartmouth College
- Multiple young investigator awards: DARPA YFA, NSF CAREER, Beckman YIA
- ISSCC Jack Kilby Award for Outstanding Student Paper
- Over $40MM in research fundraising to date
- UCSD-wide Academic Senate Teaching Award, and two ECE department teaching awards
- IEEE Fellow, Class of 2025
- ISSCC Executive Committee member; former ISSCC, VLSI, and CICC TPC member
- Startup co-founder (Traq), board member (QuantalRF), and scientific advisory board member (Nanovision and NeuroVigil)
- 24 issued US patents

Education

Ph.D. **Massachusetts Institute of Technology**, Electrical Engineering, June 2012
Thesis title: *Communication and Power Delivery Architectures for Personal Medical Devices* (GPA: 5.0/5.0)
Advisor: Anantha P. Chandrakasan

S.M. **Massachusetts Institute of Technology**, Electrical Engineering, June 2008

Thesis title: *An All-Digital Transmitter for Pulsed Ultra-Wideband Communication* (GPA: 5.0/5.0)

Advisor: Anantha P. Chandrakasan

B.Sc. **University of Alberta**, Electrical and Computer Engineering, May 2006

GPA: 4.0/4.0

Related Experience

University of California, San Diego
Vice Chair, Electrical and Computer Engineering (2024-present)
Professor, Electrical and Computer Engineering (2023-present)
Site Director, Power Management Integration Center (2021-present)
Associate Professor, Electrical and Computer Engineering (2018-2023)
Co-Founder/Co-Director, Center for Wearable Sensors (2014-present)
Assistant Professor, Electrical and Computer Engineering (2012-2018)

Expert Witness
Providing expert technical advice, reports, and depositions on a variety of patent litigation cases (2020-present)

NeuroVigil
Scientific Advisory Board Member (2020-present)

Nanovision
Scientific Advisory Board Member (2019-present)

Quantal RF
Board Member (2018-2024)

Traq / Mouthsense Inc.
Co-Founder/Scientific Advisor (2016-present)

Mercier Engineering
Owner, providing engineering and technical expertise to technology companies. (2013-present)

Massachusetts Institute of Technology*,* Microsystems Technology Laboratory, *Research Assistant* (2006-2012)

Intel Corporation, Circuits Research Lab, *Graduate Technical Intern* (2008)

Selected Honors and Awards

- **IEEE Fellow** – awarded to less than 0.1% of voting members in the IEEE Solid-State Circuits Society – Class of 2025
- **Teacher of the Year Award** – Jacobs School of Engineering at UC San Diego Annual Best Teacher Award Selected by Ballot of the Students – 2023

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- **IEEE International Solid-State Circuits Conference (ISSCC) Author-Recognition Award** – Awarded to authors who have contributed more than 20 papers to ISSCC – 2023
- **San Diego County Engineering Council Outstanding Engineer Award** – Awarded annually to a single local engineer who has made significant technical contributions to their society – 2020
- **National Academy of Engineering Frontiers of Engineering Speaker** – A competitive invitation-only event for those who have demonstrated accomplishment in engineering research and technical work with recognizable contributions to advancing the frontiers of engineering – 2019
- **IEEE Solid-State Circuits Society Distinguished Lecturer** – Nominated to deliver invited lecturers at local chapters and regional meetings across the world for a two-year term – 2019
- **NSF CAREER Award** – The National Science Foundation's most prestigious awards in support of early-career faculty – 2018
- **Biocom Catalyst Award** – Awarded to ten academics, entrepreneurs, investors, corporate leaders, and business advisers under 40 years old who are igniting innovation and growth in the San Diego and Los Angeles life sciences industry – 2017
- **IEEE Senior Member –** Elected for showing significant performance over a 10+ year career **–** 2017
- **Moore Inventor Fellow Finalist** – Selected as a top-10 fellow amongst >200 other applicants at top US universities; received $25k award – 2017
- **UCSD Academic Senate Distinguished Teaching Award** – Awarded yearly to five distinguished teachers across all departments at UCSD (totaling ~2200 senate members **–** i.e., the top 0.2% of teachers). First winner in the ECE department since Jack Wolf in 1999. Received 2016
- **DARPA Young Faculty Award** – Awarded to young faculty members who propose high-impact, high-risk research programs – 2015
- **Beckman Young Investigator Award** – Awarded to eight junior faculty members across the US for innovating research within the chemical and biological sciences – 2015
- **Hellman Fellowship Award** – Awarded to junior faculty members who show capacity for great distinction in their research and creative activities – 2014
- **Graduate Teaching Award** – Awarded annually to one (of ~50) faculty in the UCSD ECE department for outstanding teaching and service – 2013
- **Jack Kilby Award** – One awarded per year for outstanding student paper at the *International Solid-State Circuits Conference (ISSCC)* – received 2010
- **Intel Foundation Ph.D. Fellowship** – awarded to 26 applicants across the US – 2009
- **Post Graduate Scholarship** – Natural Sciences and Engineering Council of Canada (NSERC) – 2007, 2009
- **Best Presentation Award**, Microsystems Technology Lab Annual Research Conference – 2008, 2010
- **Julie Payette Postgraduate Research Fellowship** – Awarded to the top 24 Master's NSERC applicants in Canada – 2006
- **APEGGA Medal** – Highest undergraduate GPA in Electrical Engineering – 2006
- **Atco Electric Centennial Award** – March 2005
- **Schlumberger Scholarship** in Electrical Engineering – 2004, 2005

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Other Awards and Recognitions

- **IEEE Custom Integrated Circuits Conference (CICC) 2025** – Best Paper Award Finalist
- **IEEE International Solid-State Circuits Conference (ISSCC) Student Research Preview Poster Award** – 2024
- **IEEE Solid-State Circuits Society (SSCS) Outstanding Reviewer Reward** – 2024.
- **IEEE ISCAS Women in Circuits and Systems (WiCAS)** – Runner Up Paper Award – 2023.
- **IEEE International Symposium on Circuits and Systems (ISCAS)** – Best Runner Up Paper – 2023.
- **Qualcomm Innovation Fellowship (QIF) 2023** – Winner
- **IEEE Applied Power Electronics Conference (APEC)** – Outstanding Presentation Award 2023 – "A Series/Parallel Magnetic-Less Step-Down Converter Based on Piezoelectric Resonators"
- **IEEE Brain Technical Community and IEEE Solid-State Circuits Society** – Brain-Related Best Paper Award 2021 – "An Optically-Addressed Nanowire-Based Retinal Prosthesis with 73% RF-to-Stimulation Power Efficiency and 20nC-to-3^C Wireless Charge Telemetering" presented at ISSCC 2021.
- **IEEE Symposium on Very Large Scale Integration (VLSI Symposium) 2020** – Best Student Paper Award Nominee – "A -105dB THD 87dB-SNDR VCO-based Sensor Front-end Enabled by Background-Calibrated Differential Pulse Code Modulation"
- **IEEE Symposium on Very Large Scale Integration (VLSI Symposium) 2020** – Best Student Paper Award Nominee – "A 4.4μW -92/-90.3dBm Sensitivity Dual-mode BLE/Wi-Fi Wake-up Receiver"
- **Qualcomm Innovation Fellowship (QIF) 2020** – Winner
- **IEEE EMBS Workshop on Brain, Mind and Body – Cognitive Neuroengineering for Health and Wellness 2019 –** Third place poster award
- **IEEE Custom Integrated Circuits Conference (CICC) 2019** – Outstanding Student Paper Award Nominee
- **IEEE Custom Integrated Circuits Conference (CICC) 2018** – Outstanding Student Paper Award Nominee
- **IEEE Custom Integrated Circuits Conference (CICC) 2015** – Outstanding Student Paper Award Nominee
- **Qualcomm Innovation Fellowship (QIF) 2014** – Finalist

List of Publications

BOOKS

[1] S. Ha, C. Kim, P.P. Mercier, G.C. Cauwenberghs, **High-Density Integrated Electrocortical Neural Interfaces**, Elsevier Academic Press, 2019, 187 pages.

[2] M.M. Hella and P.P. Mercier (eds), **Power Management Integrated Circuits,** CRC Press, 2016, 329 pages.

[3] P.P. Mercier and A.P. Chandrakasan (eds), **Ultra-low-power Short-Range Radios,** Springer, 2015, 394 pages.

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BOOK CHAPTERS

[1] F. Laiwalla, V.W. Leung, J. Lee, P. Mercier, P. Asbeck, R. Rao, L. Larson, A. Nurmikko, "Next Generation Microscale Wireless Implant System for High-Density, Multi-areal, Closed-Loop Brain Computer Interfaces," in **Brain-Computer Interface Research**, C. Guger et al. (eds.), Springer Nature Switzerland, 2021.

[2] S. Ha, C. Kim, H. Wang, Y.M. Chi, P.P. Mercier, G. Cauwenberghs, "Low-power integrated circuits for wearable electrophysiology," in **Wearable Sensors – Fundamentals, Implementation and Applications 2nd Edition**, E. Sazonov, Ed., Academic Press, 2021.

[3] L.G. Salem and P.P. Mercier, "Recursive Switched-Capacitor DC-DC Converters," in **Power Management Integrated Circuits**, M.M. Hella and P.P. Mercier, Eds., CRC Press, 2016.

[4] D. Lee and P.P. Mercier, "Introduction to Ultra Low Power Transceiver Design," in **Ultra-low-power Short-Range Radios**, P.P. Mercier and A.P. Chandrakasan, Eds., Cham, Switzerland: Springer, 2015.

[5] P.M. Nadeau, A. Paidimarri, P.P. Mercier, and A.P. Chandrakasan, "Architectures for Ultra-Low-Power Multi-Channel Resonator-Based Wireless Transceivers," in **Ultra-low-power Short-Range Radios,** P.P. Mercier and A.P. Chandrakasan, Eds., Cham, Switzerland: Springer, 2015.

[6] P.P. Mercier, D.C. Daly, F.S. Lee, D.D. Wentzloff, and A.P. Chandrakasan, "Pulsed Ultra-Wideband Transceivers," in **Ultra-low-power Short-Range Radios,** P.P. Mercier and A.P. Chandrakasan, Eds., Cham, Switzerland: Springer, 2015.

[7] P.P. Mercier and A.P. Chandrakasan, "Near-Field Wireless Power Transfer," in **Ultra-low-power Short-Range Radios**, P.P. Mercier and A.P. Chandrakasan, Eds., Cham, Switzerland: Springer, 2015.

JOURNAL PAPERS

[1] N.S.K. Fathy, R. Vatsyayan, A.M. Bourhis, S.A. Dayeh, P.P. Mercier, "A TDMA Neural Recording SoC With IIR-RLS Adaptive Filters for 83.4 dB Artifact Suppression Across 256 Channels," *IEEE Journal of Solid-State Circuits*, 2025.

[2] D. Valencia, P.P. Mercier, A. Alimohammad, "An Efficient Brain-Switch for Asynchronous Brain-Computer Interfaces," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 19, no. 1, pp. 130-141, Feb. 2025.

[3] W.-C.B. Liu, G. Pillonnet, P.P. Mercier, "An Integrated Dual-Side Series/Parallel Piezoelectric Resonator-Based DC–DC Converter," *IEEE Journal of Solid-State Circuits*, vol. 59, no. 12, pp. 4162-4174, Dec. 2024.

[4] H. Lu, P.P. Mercier, "Linear Periodically Time-Variant Digital PLL Phase Noise Modeling Using Conversion Matrices and Uncorrelated Upsampling," *IEEE Transactions on Circuits and Systems I*, vol. 71, no. 12, pp. 6021-6033, Dec. 2024.

[5] Y. Xu, A. Uppal, M.S. Lee, K. Mahato, B.L. Wuerstle, M. Lin, O. Djassemi, T. Chen, R. Lin, A. Paul, S. Jain, F. Chapotot, E. Tasali, P. Mercier, S. Xu, J. Wang, G. Cauwenberghs, "Earable Multimodal Sensing and Stimulation: A Prospective Towards Unobtrusive Closed-Loop Biofeedback," *IEEE Reviews in Biomedical Engineering*, vol. 18, pp. 5-25, Nov. 2024.

[6] W.-C.B. Liu, P.P. Mercier, "Design and Analysis of a Frontside Series/Parallel Piezoelectric Resonator-Based DC-DC Converter," *IEEE Transactions on Power Electronics*, vol. 40, no. 1, pp. 1389-1403, Sep. 2024.

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[7] J. Tian, P. Mercier, C. Paolini, "Ultra low-power, wearable, accelerated shallow-learning fall detection for elderly at-risk persons," *Smart Health*, vol. 33, Sep. 2024.

[8] N.S.K. Fathy, R. Vatsyayan, A.M. Bourhis, S.A. Dayeh, P.P. Mercier, "A 0.00179 mm^2/Ch Chopper-Stabilized TDMA Neural Recording System with Dynamic EOV Cancellation and Predictive Mixed-Signal Impedance Boosting," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 18, no. 4, pp. 908-922, Aug. 2024.

[9] H. Lu, A.G. Gadelkarim, J. Huang, P.P. Mercier, "A 0.69-mW Sub-Sampling NB-IoT Receiver Employing a Linearized Q-Boosted LNA," *IEEE Open Journal of the Solid-State Circuits Society*, vol. 4, pp. 57-68, Jun. 2024.

[10] D. Valencia, P.P. Mercier, A. Alimohammad, "Efficient In Vivo Neural Signal Compression Using an Autoencoder-based Neural Network," *IEEE Transactions on Biomedical Circuits and Systems*, vol 18., no 3, pp. 691-701, Jun. 2024.

[11] G. Pillonnet, P. Mercier, "Analytical Benchmarking of Direct Hybrid Switched-Capacitor DC-DC Converters," *IEEE Open Journal of Power Electronics*, vol. 5, pp. 664-682, May 2024.

[12] J. Wu, A. Akinin, J. Somayajulu, M.S. Lee, A. Paul, H. Lu, Y. Park, S.-J. Kim, P.P. Mercier, G. Cauwenberghs, "A Low-Noise Low-Power 0.001Hz-1kHz Neural Recording System-on-Chip with Sample-Level Duty-Cycling," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 18, no. 2, pp. 263-273, Apr. 2024.

[13] E.H. Shinn, A.S. Garden, S.K. Peterson, D.J. Leupi, M. Chen, R. Blau, L. Becerra, T. Rafeedi, J. Ramirez, D. Rodriquez, F. VanFossen, S. Zehner, P.P. Mercier, J. Wang, K. Hutcheson, E. Hanna, D.J. Lipomi, "Iterative Patient Testing of a Stimuli-Responsive Swallowing Activity Sensor to Promote Extended User Engagement During the First Year After Radiation: Multiphase Remote and In-Person Observational Cohort Study", *JMIR Cancer*, 2024.

[14] H. Lu, H.R. Kooshkaki, P.P. Mercier, "A Mixer-First Receiver with On-Demand Passive Harmonic Rejection," *IEEE Solid-State Circuits Letters*, vol. 7, pp. 46-49, Jan. 2024.

[15] S.-H. Kuo, M. Dunna, D. Bharadia, P.P. Mercier, "A WiFi and Bluetooth Low Energy Backscatter Combo Chip with Beam Steering Capabilities," *IEEE Open Journal of the Solid-State Circuits Society*, vol. 3, pp. 239-248, Sep. 2023.

[16] Y. Xu, E. De la Paz, A. Paul, K. Mahato, J.R. Sempionatto, N. Tostado, M. Lee, G. Hota, M. Lin, A. Uppal, W. Chen, S. Dua, L. Yin, B.L. Wuerstle, S. Deiss, P. Mercier, S. Xu, J. Wang, G. Cauwenberghs, "In-ear integrated sensor array for the continuous monitoring of brain activity and of lactate in sweat," *Nature Biomedical Engineering*, Sep. 2023.

[17] M. Meng, M. Dunna, S.-K. Kuo, P.-H.P. Wang, D. Bharadia, P.P. Mercier, "A Fully-Reflective WiFi-Compatible Backscatter Communication System with Retro-Reflective MIMO Gain for Improved Range," *IEEE Journal of Solid-State Circuits,* vol. 58, no. 9, pp. 2501-2512, Sep. 2023.

[18] S.-K. Kuo, M. Dunna, H. Lu, A. Agarwal, D. Bharadia, P.P. Mercier, "LTE-Powered BLE-to-WiFi Backscattering Chip Toward Single-Device Interrogation RFID-Like Systems," *IEEE Solid-State Circuits Letters*, vol. 6, no. 8, pp. 225-228, Aug. 2023.

[19] W.-C. Liu, C.-H. Cheng, P.P. Mercier, C.C. Mi, "Small Signal Analysis and Design of Constant On-Time Controlled Buck Converters with Duty-Cycle-Independent Quality Factors," *IEEE Transactions on Power Electronics*, vol. 38, no. 7, pp. 8379-8393, Jul. 2023.

[20] E. Wen, D.F. Sievenpiper, P.P. Mercier, "Analysis of Coil Coupling in the Near-Field Far-Field Hybrid Region," *IEEE Antennas and Wireless Propagation*, vol. 22, no. 7, pp. 1771-1775, Jul. 2023.

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[21] H.A. Zadeh, H.R. Kooshkaki, K.-Y. Lee, P.P. Mercier, "An Adaptive Constant-On-Time-Controlled Hybrid Multilevel DC-DC Converter Operating from Li-ion Battery Voltages with Low Spurious Output," *IEEE Transactions on Power Electronics*, vol. 38, no. 5, pp. 5763-5776, May 2023.

[22] C.B. Gungor, P.P. Mercier, H. Toreyin, "A 2.2 nW Analog Electrocardiogram Processor based on Stochastic Resonance Achieving a 99.94% QRS Complex Detection Sensitivity," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 17, no. 1, Feb. 2023.

[23] A. Nikoofard, H. Givehchian, N. Bhaskar, A. Schulman, D. Bharadia, P.P. Mercier, "Protecting Bluetooth User Privacy through Obfuscation of Carrier Frequency Offset," *IEEE Transactions on Circuits and Systems II*, vol. 70, no. 2, pp. 541-545, Feb. 2023.

[24] D. Valencia, G. Leone, N. Keller, P.P. Mercier, A. Alimohammad, "Power-Efficient In Vivo Brain-Machine Interfaces via Brain-State Estimation," *Journal of Neural Engineering*, 20, 016032, Jan. 2023.

[25] B. Polat, T. Rafeedi, L. Becerra, A.X. Chen, K. Chiang, V. Kaipu, R. Blau, P.P. Mercier, C.-K. Cheng, D.J. Lipomi, "External Measurement of Swallowed Volume During Exercise Enabled by Stretchable Derivatives of PEDOT:PSS, Graphene, Metallic Nanoparticles, and Machine Learning," *Advanced Sensor Research*, 2200060, Jan. 2023.

[26] B.H. Lam, H. Lu, A.G. Gadelkarim, N. Fathy, P. Gudem, P.P. Mercier, "A 0.11mW 2.4GHz Receiver Employing a Q-Boosted Impedance Transformer and Regenerative Amplifier Achieving a -101dBm Sensitivity and -28dB SIR," *IEEE Solid-State Circuits Letters*, vol. 6, Jan. 2023.

[27] H.R. Kooshkaki, P.P. Mercier, "A 36 uW 2.8–3.4 dB Noise Figure Impedance Boosted and Noise Attenuated LNA for NB-IoT," *IEEE Transactions on Circuits and Systems I,* vol. 70, no. 1, pp. 101-113, Jan. 2023.

[28] E. De La Paz, N.H. Maganti, A. Trifonov, I. Jeerapan, K. Mahato, L. Yin, T. Sonsa-ard, N. Ma, W. Jung, R. Burns, A. Zarrinpar, J. Wang, P.P. Mercier, "A self-powered ingestible wireless biosensing system for real-time in situ monitoring of gastrointestinal tract metabolites," *Nature Communications*, vol. 13, 7405, Dec. 2022.

[29] P.P. Mercier, B.H. Calhoun, P.-H.P. Wang, A. Dissanayake, L. Zhang, D.A. Hall, S.M. Bowers, "Low-Power RF Wake-Up Receivers: Analysis, Trade-Offs, and Design," *IEEE Open Journal of the Solid-State Circuits Society, vol. 2, pp. 144-164,* 2022.

[30] D. Valencia, P.P. Mercier, A. Alimohammad, "In Vivo Neural Spike Detection with Adaptive Noise Estimation," *Journal of Neural Engineering*, 19, 046018, Jul. 2022.

[31] B.H. Lam, P. Gudem, P.P. Mercier, "Analysis and Measurement of Noise Suppression in Nonlinear Regenerative Amplifier," *IEEE Transactions on Circuits and Systems I*, vol. 69, no. 10, pp. 4117-4127, Oct. 2022.

[32] S. Chamanian, P.P. Mercier, "MIPSIMO: A Multi-Input Piezo-Adaptive Single-Inductor Multi-Output Energy Harvester Achieving using a Shared Inductor with an Integrated Analog Computer Achieving 95% MPPT Efficiency," *IEEE Solid-State Circuits Letters*, vol. 5, pp. 222-225, Sep. 2022.

[33] A. Nikoofard, P.P. Mercier, "A 900MHz GFSK and 16-FSK TX Achieving up to 63.9% TX Efficiency and 76.2% PA Efficiency via a DC-DC-Powered Class-D VCO and a Class-EE PA," *IEEE Transactions on Circuits and Systems II*, vol. 69, no. 9, pp. 3739-3743, Sep. 2022.

[34] C.B. Gungor, P.P. Mercier, H. Toreyin, "A Stochastic Resonance Electrocardiogram Enhancement Algorithm for Robust QRS Detection," *IEEE Journal of Biomedical and Health Informatics*, vol. 26, no. 8, pp. 3743-3754, Aug. 2022.

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[35] H. Cui, D. Yao, H. Lu, A. Calderon, Z. Xu, S. Davaria, Z. Wang, P. Mercier, P. Tarazaga, X. Zheng, "Design and printing of proprioceptive three-dimensional architecture robotic metamaterials," *Science*, 376, 6599, pp. 1272-1272, Jun. 2022.

[36] F. Tehrani, H. Teymourian, B. Wuerstle, J. Kavner, R. Patel, A. Furmidge, R. Aghavali, H. Hosseini-Toudeshki, C. Brown, F. Zhang, K. Mahato, Z. Li, A. Barfidokht, L. Yin, P. Warren, N. Huang, Z. Patel, P.P. Mercier & J. Wang, "An integrated wearable microneedle array for the continuous monitoring of multiple biomarkers in interstitial fluid," *Nature Biomedical Engineering*, May 2022.

[37] M. Meng, H.R. Kooshkaki, X. Wang, S.-H. Kuo, E. Wen, P.P. Mercier, "A GMSK/PAM4 Multi-Channel Magnetic Human Body Communication Transceiver," *IEEE Solid-State Circuits Letters*, vol. 5, pp. 66-69, Mar. 2022.

[38] N.S.K. Fathy, J. Huang, P.P. Mercier, "A Digitally Assisted Multiplexed Neural Recording System With Dynamic Electrode Offset Cancellation via an LMS Interference-Canceling Filter," *IEEE Journal of Solid-State Circuits*, vol. 57, no. 3, pp. 953-964, Mar. 2022.

[39] E. Wen, D. Sievenpiper, P.P. Mercier, "Channel Characterization of Magnetic Human Body Communication," *IEEE Transactions on Biomedical Engineering*, vol. 69, no 2, pp. 569-579, Feb. 2022.

[40] C. Pochet, J. Huang, P. Mercier, D. Hall, "A 174.7-dB FoM, 2nd-order VCO-based ExG-to-Digital Front-End Using a Multi-phase Gated-Inverted Ring Oscillator Quantizer," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 15, no. 6, pp. 1283-1294, Dec. 2021.

[41] A. Akinin, J.M. Ford, J. Wu, C. Kim, H.D. Thacker, P.P. Mercier, G. Cauwenberghs, "An Optically Addressed Nanowire-Based Retinal Prosthesis With Wireless Stimulation Waveform Control and Charge Telemetering," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 11, pp. 3263-3273, Nov. 2021. **(ISSCC Special Issue)**

[42] J. Huang, P.P. Mercier, "A 178.9-dB FoM 128-dB SFDR VCO-Based AFE for ExG Readouts With a Calibration-Free Differential Pulse Code Modulation Technique," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 11, pp. 3236-3246, Nov. 2021.

[43] W.-C. Liu, C.-H. Cheng, C.C. Mi, P.P. Mercier, "A Novel Ultra-Fast Transient Constant On-Time Buck Converter for Multi-Phase Operation," *IEEE Transactions on Power Electronics*, vol. 36, no. 11, pp. 13096-13106, Nov. 2021.

[44] B. Polat, L. Becerra, P.-Y. Hsu, V. Kaipu, P. Mercier, C.-K. Cheng, D. Lipomi, "Epidermal Graphene Sensors and Machine Learning for Estimating Swallowed Volume," *ACS Applied Nano Materials*, Aug. 2021. **(Editors' Choice highlight)**

[45] J. Lee, V. Leung, A. Lee, J. Huang, P. Asbeck, P.P. Mercier, S. Shellhammer, L. Larson, F. Laiwalla, A. Nurmikko, "Neural recording and stimulation using wireless networks of microimplants," *Nature Electronics*, no 4, pp. 604-614, Aug. 2021.

[46] J. Huang, P.P. Mercier, "A 94.2-dB SNDR 142.6-μW VCO-based Audio ADC with a Split-ADC Differential Pulse Code Modulation Architecture," *IEEE Solid-State Circuits Letters*, vol. 4, pp. 121-124, Jun. 2021.

[47] C. Gungor, P. Mercier, H. Toreyin, "A 1.2nW Analog Electrocardiogram Processor Achieving a 99.63% QRS Complex Detection Sensitivity," *IEEE Transactions on Biomedical Circuits and Systems*, vol. 15, no. 3, pp. 617-628, Jun. 2021.

[48] C. Gungor, P.P. Mercier, H. Toreyin, "Investigating well potential parameters on neural spike enhancement in a stochastic-resonance pre-emphasis algorithm," *Journal of Neural Engineering*, May 2021.

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[49] J. Huang, P.P. Mercier, "A 112-dB SFDR 89-dB SNDR VCO-based Sensor Front-end Enabled by Background-Calibrated Differential Pulse Code Modulation," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 4, pp. 1046-1057, Apr. 2021. **(VLSI Special Issue)**

[50] P.-H. P. Wang, P.P. Mercier, "A Dual-Mode Wi-Fi/BLE Wake-up Receiver," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 4, pp. 1288-1298, Apr. 2021. **(VLSI Special Issue)**

[51] A. Nikoofard, H. Abbasi Zadeh, P.P. Mercier, "A 0.6-mW 116-FSK Receiver Achieving a Sensitivity of -103 dBm at 100 kb/s," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 4, pp. 1299-1309, Apr. 2021. **(VLSI Special Issue)**

[52] P.-H. Wang, P.P. Mercier, "An Interference-Resilient BLE-Compatible Wake-up Receiver Employing Single-Die Multi-Channel FBAR-Based Filtering and a 4-D Wake-Up Signature," *IEEE Journal of Solid-State Circuits*, vol. 56, no. 4, pp. 416-426, Feb. 2021.

[53] P.-H. Wang, C. Zhang, H. Yang, M. Dunna, D. Bharadia, P.P. Mercier, "A Low-Power Backscatter Modulation System Communicating Across Tens of Meters with Standards-Compliant Wi-Fi Transceivers," *IEEE Journal of Solid-State Circuits*, vol. 55, no. 11, pp. 2959-2969, Nov. 2020. **(ISSCC Special Issue)**

[54] D.-G. Lee, A. Nikoofard, P.P. Mercier, "A -254.1 dB FoM 2.4 GHz Sub-Sampling PLL with a -76 dBc Reference Spur by Employing a Varactor-Based Cancellation Technique," *IEEE Solid-State Circuits Letters*, vol. 3, pp. 102-105, Jul. 2020.

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INVITED ABSTRACTS, PRESENTATIONS, AND POSTERS

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[5] P.P. Mercier, "Unawearables: Enabling Unobtrusive Wearable Devices via Smart Sensors and Low-Power Wireless Circuits," *Presented at the UC Davis ECE Department Distinguished Seminar Series*, Nov. 2024.

[6] P.P. Mercier, "Low-Power Wearable and Ingestible Physiochemical Monitoring Devices," *Presented at the Medical Wearables Conference*, Oct. 2024.

[7] P.P. Mercier, "Low-Power Standards-Compatible Wireless Communication Circuits for Next-Generation IoT and Wearable Applications," *Presented at the Tokyo Institute of Technology*, Tokyo, Japan, Jul. 2024.

[8] P.P. Mercier, "Low-Power Sensing and Wireless Communication Circuits," *Presented at the IEEE Internet of Things Vertical and Topical Summit*, Jan. 2024.

[9] P.P. Mercier, "Low-Power and Energy-Efficient Integrated Circuit Design for a Sustainable Future," *Presented at the IEEE Solid-State Circuits Society and Power Electronics Society: ICs Addressing Societal Grand Challenges: Sustainability and Climate Change Seminar*, Sep. 2023.

[10] P.P. Mercier, "Enabling Low-Power yet Standards Compatible Wireless Communication via Wake-Up Receivers and Backscatter Circuits," *Presented at the IEEE International Microwaves Symposium*, San Diego, CA, Jun. 2023.

[11] P.P. Mercier, "Next-Generation Wearable Hybrid Physiochemical Sensing Systems," *Presented at the Cali-Baja Symposium*, La Jolla, CA, Apr. 2023.

[12] P.P. Mercier, "Unawareables: Building Invisible yet Useful Wearable Devices," *Chancellor's Associates Colloquium*, La Jolla, CA, Mar. 2023.

[13] P.P. Mercier, "Next-Generation Wearable Sensor Technologies," *Presented at the National Academy of Engineering Southern California Regional Symposium*, San Diego, CA, Mar. 2023.

[14] P.P. Mercier, "Wearable Sensors and Low-Power WiFi-Compatible Communication Circuits for Emerging IoT Applications," *Presented at the Medical Wearables Conference*, Dec. 2022.

[15] P.P. Mercier, "Ultra-low-power Integrated Circuits and Physiochemical Sensors for Next-Generation Unawareables," *Presented at the BioXTech virtual group*, Dec. 2022.

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[16] P.P. Mercier, "Energy Harvesting and Self-Powered Sensing for Miniaturized IoT and Unawareable Devices," *Presented at the ACM International Workshop on Energy Harvesting & Energy-Neutral Sensing,* Boston, CA, Nov. 2022.

[17] P.P. Mercier, "Unaware-ables: Low-Power, Robust, and Useful Wearable Devices", *Presented at the IEEE International Microwave Symposium*, Denver, CO, Jun. 2022.

[18] P.P. Mercier, "Energy-Efficient Power Management Circuits for IoT and Wearable Devices," *Keynote presentation at the IEEE Sensors Interface Meeting*, Veldhoven, The Netherlands, May 2022.

[19] P.P. Mercier, "Energy Harvesting and Self-Powered Sensing for Miniaturized IoT and "Unawareable" Devices," *Presented at the PSMA International Energy Harvesting Workshop (EnerHarv),* Raleigh, NC, Apr. 2022.

[20] P.P. Mercier, "Enabling Low-Power yet Standards Compatible Wireless Commuication via Wake-up Receivers and Backscatter Circuits for the IoT," *Presented as an IEEE SSCS Society-wide Webinar*, Jan. 2022.

[21] P.P. Mercier, "Energy Harvesting and Self-Powered Sensing for Next-Generation "Unaware-ables" and IoT," *Presented at the Sensors Converge Conference*, (virtual due to COVID-19), Sep. 2021.

[22] P.P. Mercier, "Ultra-low-power integrated circuits and physiochemical sensors for next-generation unawearables," *IEEE Solid-State Circuits Society Distinguished Lecture at Oregon IEEE Solid-State Circuits Society local chapter*, Hillsboro, OR (virtual due to COVID-19), Jun 2021.

[23] P.P. Mercier, "Ultra-Low-Power Integrated Circuits and Physiochemical Sensors for Next-Generation Unawearables", *Presented at the International Symposium on Advanced Sensor Technology*, Seoul, Korea (virtual due to COVID-19), Mar. 2021.

[24] P.P. Mercier, "Energy-Efficient Communication Technologies for Emerging Internet-of-Things Applications," *IEEE Solid-State Circuits Society Distinguished Lecture at the SSCS Northern Virginia Section*, (virtual due to COVID-19), Oct. 2020.

[25] P.P. Mercier, "Hybrid Converters for Mobile and IoT Applications," *Presented at the Integrated Power Conversion and Power Management Conference (PwrSoC)* (virtual due to COVID-19), Nov. 2020.

[26] P.P. Mercier, "Low-Power Communication Circuits and Technologies for Emerging Internet-of-Things Applications," *IEEE Solid-State Circuits Society Distinguished Lecture at the SSCS Princeton Central Jersey Section*, (virtual due to COVID-19), Nov. 2020.

[27] P.P. Mercier, "Energy-Efficient Communication Technologies for Emerging Internet-of-Things Applications," *Presented at the 2020 RFID Conference*, (virtual due to COVID-19), Oct. 2020.

[28] P.P. Mercier, "Energy-Efficient Communication Technologies for Emerging Internet-of-Things Applications," *IEEE Solid-State Circuits Society Distinguished Lecture at the SSCS Utah Section*, (virtual due to COVID-19), Oct. 2020.

[29] P.P. Mercier, "Energy-Efficient Communication Technologies for Emerging Internet-of-Things Applications," *IEEE Solid-State Circuits Society Distinguished Lecture at the Advanced Circuits Research Center in Israel*, (virtual due to COVID-19), July 2020.

[30] P.P Mercier, "Ultra-low-power integrated circuits and physiochemical sensors for next-generation unawearables," *IEEE Solid-State Circuits Society Distinguished Lecture at the Beijing IEEE Solid-State Circuits Society local chapter*, (virtual due to COVID-19), May 2020.

[31] P.P. Mercier, "Low-Power Wireless Systems: Opportunities and Challenges," *Presented at the DARPA MTO Offsite Planning Meeting on the U.S.S. Midway*, San Diego, CA, Dec. 2019.

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[32] P.P. Mercier, "Ultra-low-power integrated circuits and physiochemical sensors for next-generation unawearables," *IEEE Solid-State Circuits Society Distinguished Lecture at the Scotland and UK IEEE Solid-State Circuits Society local chapter*, Edinburgh, UK, Sep. 2019.

[33] P.P. Mercier, "Ultra-low-power integrated circuits and physiochemical sensors for next-generation unawearables," *IEEE Solid-State Circuits Society Distinguished Lecture at the Maryland/Virginia/DC IEEE Solid-State Circuits Society and Circuits and Systems local chapter*, College Park, MD, Sep. 2019.

[34] P.P. Mercier, "Ultra-low-power integrated circuits enabling next-generation IoT applications," *Presented at the National Academy of Engineering Frontiers of Engineering event*, San Diego, CA, Jun. 2019.

[35] P.P. Mercier, "Ultra-low-power integrated circuits and physiochemical sensors for next-generation unawearables," *IEEE Solid-State Circuits Society Distinguished Lecture at the San Diego IEEE Solid-State Circuits Society local chapter*, San Diego, CA, May. 2019.

[36] P.P. Mercier, "Unawearables: Addressing Sensor, Circuit, and Energy Harvesting Challenges in Next-Generation Wearable Devices," *Presented at the IEEE Custom Integrated Circuits Conference (CICC)*, Austin, TX, Apr. 2019.

[37] P.P. Mercier, "Ultra-Low-Power Integrated Circuits and Physiochemical Sensors for Next-Generation Unawearables," *Presented at the DARPA Actuation, Sensing, and Control for Rapid Injury Response Workshop*, Arlington, VA, Apr. 2019.

[38] P.P. Mercier, "Ultra-Low-Power Integrated Circuits and Physiochemical Sensors for Next-Generation Unawearables," *Presented at the University of Southern California*, Los Angeles, CA, Nov. 2018.

[39] P.P. Mercier, "Unawearables: new wearable sensors, circuits, and analytics for unobtrusive monitoring," *Presented at the SEMI MEMS & Sensors Executive Congress*, Napa, CA, Nov. 2018.

[40] P.P. Mercier, "Ultra-small near-zero-power radios, implants, and sensing systems," *Presented at the DARPA Microsystems Exploratory Council Millimeter-Scale Wirelessly Powered Sensors Workshop*, Los Angeles, CA, Jul. 2018.

[41] P. P. Mercier, "Wearable Sensors", *Presented at the US Marine Corps Innovation Event*, La Jolla, CA, Feb. 2018.

[42] P.P. Mercier, "The Next Industrial Revolution: IoT, Wearables, and AI," *Presented at the Next Business Forum*, Seoul, South Korea, Nov. 2017.

[43] P.P Mercier, "Global Hubs for Innovative Ecosystems in Biotechnology," *Presented at the Stevanato Innovation Day*, San Diego, CA, Jun. 2017.

[44] P.P Mercier, "Non-Invasive Blood Alcohol Monitoring," *Presented at the Biomedical Technology Exhibition, sponsored by the American Institute for Medical and Biological Engineering (AIMBE) in partnership with the Congressional Research and Development Caucus and the Congressional Robotics Caucus*, Capitol Hill, Washington, DC, May 2017.

[45] P.T. Theilman, J. Warchall, P. Mercier, H. Garudari, "Work Towards a Fieldable Multi-Channel EEG System for Continuous Monitoring," in Proc. *IEEE International Symposium on Circuits and Systems (ISCAS)*, Baltimore, MD, May 2017.

[46] P.P. Mercier, "Beyond Activity Tracking: next-generation wearable and implantable sensor technologies" *Presented at the SPIE Defense and Commercial Sensing Conference*, Anaheim, CA, Apr. 2017.

[47] D.A. Hall, H. Jiang, P.-H. Wang, L. Gao, P. Sen, Y.-H. Kim, G. Rebeiz, P.P. Mercier, "A 10nW Wake-up Radio with -60dBm Sensitivity," in *Government Microcircuit Applications & Critical Technology Conference (GOMACTech),* Reno, NV, Mar. 2017.

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[48] P.P. Mercier, "Physiochemical Sensor Technologies and Ultra-Low-Power Integrated Circuits for Next-Generation "Unawearables" Systems," *Invited Seminar at the Microsystems Technology Lab at MIT*, Cambridge, MA, Dec. 2016.

[49] P.P. Mercier, "Transcutaneous Power of Single-Chip Implants," *Presented at the Sensors Global Summit*, La Jolla, CA, Dec. 2016.

[50] D. Ahn, P.P. Mercier, "A 200-kHz/6.78-MHz Wireless Power Transmitter Featuring Concurrent Dual-Band Operation," in Proc. *IEEE International SoC Design Conference (ISOCC),* Jeju, South Korea, Oct. 2016. DOI: 10.1109/ISOCC.2016.7799763

[51] P.P. Mercier, J. Rogers, A. Arias, N. Verma, J. Rabaey, "Drawing the line(s): processing sensor information in the right place(s) in energy-constrained systems," *Panel organization and presentation at the SRC SONIC Center Annual Review*, Champaign, IL, Oct. 2016.

[52] P.P. Mercier, "Wearables: an opportunity for healthcare?," *Presented at the 5G Connected Healthcare Workshop*, La Jolla, CA, May 2016.

[53] P.P Mercier, "New Circuit Topologies & Techniques for High-Efficiency Power Conversion in Compact Form Factors," *Invited seminar presented at UCLA and Intel Corporation*, Apr. 2016.

[54] P.P. Mercier, "Energy-Efficient Wearable Sensors," *Presented at the UCSD Orthopaedic Surgery Research Conference*, April 2016.

[55] P.P. Mercier and L.G. Salem, "Multi-Ratio Switched-Capacitor DC-DC Converters for Power Management Applications," *Presented at the International Symposium on Quality Electronic Design*, Santa Clara, CA, Mar. 2016.

[56] P.P. Mercier, "Energy-Harvesting for Autonomous Operation of Low-Power Wireless Sensors," *Presented at the Sensors Global Summit*, La Jolla, CA, Nov. 2015.

[57] P.P. Mercier, "Enabling energy-autonomous wearable and implantable sensors through energy harvesting and near-zero-power electronics," *Presented at the KAIST-UCSD Joint Symposium on Wearable Devices*, Daejeon, Korea, Oct. 2015.

[58] P.P. Mercier, "Enabling wide output voltage range switched-capacitor DC-DC converters," *Presented at a SRC/SONIC eWorkshop*, Jun. 2015.

[59] P.P. Mercier, "Next generation switched-capacitor DC-DC converter topologies," *Presented the at the CMOS Emerging Technologies Research Symposium*, Vancouver, BC, May 2015.

[60] P.P. Mercier, "Harvesting small amounts of power to enable miniaturized sensors," *Presented at the Trillion Sensors Summit*, La Jolla, CA, Nov. 2014

[61] P.P. Mercier, "Efficient on-chip power conversion for energy harvesting and low-power mobile applications," *Presented at the International Power Supply On Chip Workshop*, Boston, MA, Oct. 2014.

[62] P.P. Mercier, "A Tutorial on Wireless Power Transfer and Miniaturized DC/DC Power Converters," *Presented at SPAWAR Systems Center Pacific*, San Diego, CA, June 2014.

[63] P.P. Mercier, "New Advances in Wearable Devices, Biosensors, and Analytics", Panelist at the *Digital Health Forum of San Diego: The Future of Wearable Technologies in Healthcare,* La Jolla, CA, June 2014.

[64] P.P. Mercier, "Breaking down power barriers: efficient and miniaturized energy management and energy harvesting," *Presented at the Huawei Power Summit*, San Diego, CA, May 2014.

[65] P.P. Mercier S. Bandyopadhyay, A.C. Lysaght, K.M. Stankovic, A.P. Chandrakasan, "Powering Wireless Devices from the Biologic Battery in the Inner-Ear," *IEEE International SoC Conference*, Irvine, CA, Oct. 2013.

[66] P.P. Mercier and V. Sridharan, "Low-Power Transmitters for Body-Area Networks," *IEEE Symposium on Power Amplifiers for Wireless Communication*, La Jolla, CA, Sep. 2013.

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[67] P.P. Mercier, "Powering a 2.4 GHz Radio from the Biologic Battery in the Inner-Ear," *Presented at the CMOS Emerging Technologies Symposium*, Whistler, BC, Canada, Jul. 2013.

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[69] A.C. Lysagth, P.P. Mercier, S. Bandyopadhyay, A.P. Chandrakasan, and K.M. Stankovic, "Endocochlear Potential Powered Electronics" *Associated for Research in Otolaryngology Annual MidWinter Meeting*, vol. 36, Baltimore, MD, Feb., 2013.

[70] P.P. Mercier, "Enabling study and control of insects through extreme miniaturization of wireless electronics," *Presented at Burapha Univeristy,* Chonburi Province, Thailand, Dec., 2012.

[71] P.P. Mercier, "nW Energy Harvesting: What can it do for you?," *Presented at the Office of Naval Research Power and Energy Systems 6.1 Program Review*, San Diego, CA, Nov. 2012.

[72] P.P. Mercier, "Ultra-Low-Power Radios for Miniaturized Sensing Systems," *Presented at the Center for Wireless Communications Semiannual Research Review,* La Jolla, CA, Nov. 2012.

[73] P.P. Mercier, "Zero-Leakage Electronics and Opportunities in Miniaturized Wireless Systems," *Presented at the Center for Magnetic Recording Research Review*, La Jolla, CA, Oct. 2012.

[74] P.P. Mercier, "Cyborg Insects and Autonomous Sensors: How Efficient Radios can Enable the Next Generation of Connectivity," *Presented at the Qualcomm Research Center*, San Diego, CA, Oct. 2012.

[75] A. Paidimarri, P. Nadeau, P.P. Mercier, and A. Chandrakasan, "Ultra-low Power FBAR-based Multi-Channel Transceivers," *Presented at the ISSCC Student Research Preview*, San Francisco, CA, Feb. 2012.

[76] P.P. Mercier, "Self-Powered Personal Microsystems for Medical Monitoring Applications," *Presented at TechConnect World*, Boston, MA, Jun. 2011.

[77] P.P. Mercier, "Attaining Extreme Energy Efficiency in Body-Area Networks Using Electronic Textiles," *Presented at the MEDRC Next Generation Medical Electronic Systems Workshop*, Cambridge, MA, May, 2011.

[78] P.P. Mercier, "Connected Health for Remote Patient Monitoring," *Presented at the MTL Annual Research Conference (MARC)*, Cambridge, MA, Jan. 2010.

[79] P.P. Mercier, "Personal Medical Connectivity: Research Overview," *Presented at the Intel Digital Health Group*, Hillsboro, OR, Oct. 2009.

[80] P.P. Mercier, "Energy Efficient Pulsed-UWB for Miniaturized Flying Vehicles," *Presented at the CMOS Emerging Technologies Workshop*, Banff, AB, Canada, Feb. 2009.

[81] P.P. Mercier, "An Energy-Efficient UWB Transmitter with Dual Capacitively-Coupled Digital Power Amplifiers," *Presented at the Center for Integrated Circuits and Systems*, Cambridge, MA, Apr. 2008.

[82] P.P. Mercier, "A 22pJ/pulse All-Digital UWB Transmitter in 90nm CMOS," *Presented at the International Solid-State Circuits Conference (ISSCC) Student Forum*, San Francisco, CA, Feb. 2008.

[83] P.P. Mercier, "Fully Integrated Pulsed-UWB Transceivers for Small Lightweight Flying Vehicles," *Presented at the MTL Annual Research Conference (MARC)*, Waterville Valley, MA, Jan. 2008.

[84] P.P. Mercier, "Cost Modeling for Vertically Integrated Chip Sets," *Presented at the CMOS Emerging Technologies Workshop*, Banff, AB, Canada, Jul. 2006.

ISSUED PATENTS

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[1] P.-H. Wang, P. Mercier, D. Bharadia, “Low Power Wi-Fi backscatter communication,” U.S. Patent 12,349,069, Jul. 1, 2025.

[2] M. Dunna, M. Meng, P.P. Mercier, D. Bharadia, “Termination circuit for low power backscatter communication,” U.S. Patent 12,267,127 B2, Apr. 1, 2025.

[3] P. Mercier, J. Park, “Low Power Magnetic Field Body Area Network With Quenching and Quick Start,” U.S. Patent 12,121,318, Oct. 22, 2024.

[4] J. Wang, A.J. Bandodkar, P.P. Mercier, “Non-invasive and wearable chemical sensors and biosensors,” U.S. Patent 12,023,154, Jul. 2, 2024.

[5] J. Wang, P. Mercier, “Salivary Biosensors and Biofuel Cells,” U.S. Patent 11,980,462, May 14, 2024.

[6] J. Wang, P. Mercier, A.F. Yeknami, S. Imani, “Self-Powered Biosensors,” U.S. Patent 11,633,134, Apr. 25, 2023.

[7] P.-H. Wang, P. Mercier, “BLE and/or WiFi Compliant and Blocker-Resilient Wake-up Receiver and Method,” U.S. Patent 11,570,709, Jan 31, 2023.

[8] H. Wang, P. Mercier, “Near Zero Power Fully Integrated Digital Conversion, Sensors, and Sensing Methods,” U.S. Patent 11,444,633, Sep. 13, 2022.

[9] S. Amin, P. Mercier, “Li-ion-compatible fully-integrated hybrid converter,” U.S. Patent 11,356,017, Jun. 7, 2022.

[10] P. Mercier, H. Wang, “Stabilized voltage and current reference generator and circuits,” U.S. Patent 11,334,105, May 17, 2022.

[11] J. Wang, P. Mercier, “Flexible epidermal multimodal health monitor,” U.S. Patent 11,122,982, Sep. 21, 2021.

[12] X. Wang, P. Mercier, “Low Power Transmitter Oscillator Circuits and Methods,” U.S. Patent 10,897,240, Jan. 19, 2021.

[13] P. Mercier, H. Wang, “Near Zero Power Charging to Digital Converter, Sensors, and Sensing Methods,” U.S. Patent 10,877,439, Dec. 29, 2020.

[14] C. Kim, G. Cauwenberghs, P.P. Mercier, S. Ha, J. Park, A. Akinin, “Resonant Regulating Rectifier with an Integrated Antenna,” U.S. Patent 10,873,215, Dec. 22, 2020.

[15] P. Mercier, D. Ahn, “Wireless Power Transfer Device and Method with Dual-Frequency Operation,” U.S. Patent 10,855,115, Dec. 1, 2020.

[16] P-H. Wang, H. Jiang, D. Hall, P. Mercier, “Low Power Wake-up Receiver,” U.S. Patent 10,804,946, Oct. 13, 2020.

[17] C.-K. Cheng, P. Mercier, S.-H. Weng, “Electrical Wearable Capacitive Biosensor and Noise Artifact Suppression Method,” U.S. Patent 10,729,379, Aug. 4, 2020.

[18] J. Wang, A.J. Bandodkar, P. Mercier, “Non-invasive and Wearable Chemical Sensors and Biosensors,” U.S. Patent 10,722,160, Jul. 28, 2020.

[19] S. Ha, G. Cauwenberghs, C. Kim, J. Park, P.P. Mercier, A. Akinin, H. Wang, C.H. Maier, “Radio Frequency Powered Adiabatic Stimulation with Energy Replenishment,” U.S. Patent 10,716,948, Jul 21, 2020.

[20] T. Nguyen, H. Garudadri, P. Mercier, A. Boothroyd, C. Mackersie, “External Device Leveraged Hearing Assistance and Noise Suppression Device, Method and Systems,” U.S. Patent 10,701,495, Jun. 30, 2020.

[21] J. Park, P. Mercier, “Low power magnetic field body area network,” U.S. Patent 10,623,112, Apr. 14, 2020.

[22] J. Wang, P. Mercier, “Salivary biosensors and biofuel cells,” U.S. Patent 10,595,759, Mar. 24, 2020.

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[23] L.G. Salem, P.P. Mercier, "Switched capacitor DC-to-DC converter and power conversion control methods," U.S. Patent 10,374,511, Aug. 6, 2019.

[24] L.G. Salem, P.P. Mercier, "Multi-level adiabatic charging methods, devices and systems," U.S. Patent 10,348,300, Jul. 9, 2019.

[25] L.G. Salem, J.F. Buckwalter, P.P. Mercier, "Switched Capacitor House of Cards Power Amplifier," U.S. Patent 10,333,477, Jun. 25, 2019.

[26] L.G. Salem, P.P. Mercier, "Successive approximation digital voltage regulation methods, devices and systems," U.S. Patent 10,224,944, Mar. 5, 2019.

[27] K. Stankovich, A. Chandrakasan, P. Mercier, S. Bandyopadhyay, A. Lysaght, "Energy Extraction," U.S. Patent 9,369,005, Jun. 14, 2016.

[28] P.P. Mercier and A.P. Chandrakasan, "Multi-Taped Inductively-Coupled Charging System," U.S. Patent 9,293,942, Mar. 22, 2016.

Teaching Experience

University of California, San Diego La Jolla, CA

Instructor

Fall 2024: ECE 203 – Biomedical Integrated Circuits and Systems
Spring 2024: ECE 165 – Digital Integrated Circuits
Fall 2023: ECE 203 – Biomedical Integrated Circuits and Systems (87% instructor rating)
Spring 2023: ECE 165 – Digital Integrated Circuits (98% instructor rating)
Fall 2022: ECE 203 – Biomedical Integrated Circuits and Systems (92% instructor rating)
Spring 2022: ECE 165 – Digital Integrated Circuits (93% instructor rating)
Fall 2021: ECE 203 – Biomedical Integrated Circuits and Systems (83% instructor rating)
Spring 2021: ECE 165 – Digital Integrated Circuits (85% instructor rating)
Fall 2020: ECE 203 – Biomedical Integrated Circuits and Systems (94% instructor rating)
Spring 2020: ECE 165 – Digital Integrated Circuits (92% instructor rating – **even during fully virtual instruction due to COVID-19**)
Fall 2019: ECE 203 – Biomedical Integrated Circuits and Systems (94% instructor rating – **TA won the best ECE TA Award**)
Spring 2019: ECE 165 – Digital Integrated Circuits (96% course rating)
Fall 2018: ECE 203 – Biomedical Integrated Circuits and Systems (95% instructor rating)
Winter 2018: ECE 165 – Digital Integrated Circuits (100% instructor rating)
Winter 2018: ECE 203 – Biomedical Integrated Circuits and Systems (91% instructor rating)
Spring 2017: ECE 165 – Digital Integrated Circuits (100% instructor rating)
Spring 2017: ECE 203 – Biomedical Integrated Circuits and Systems (93% instructor rating)
Fall 2016: ECE260A - VLSI Digital System Algorithms and Architectures (93% instructor rating)
Spring 2015: ECE 165 – Digital Integrated Circuits **(100% instructor & course rating from an 82 student class – ECE dept. record)**
Winter 2015: ECE 203 – Biomedical Integrated Circuits and Systems (93% instructor rating)
Fall 2014: ECE260A - VLSI Digital System Algorithms and Architectures (87% instructor rating)
Spring 2014: ECE 165 – Digital Integrated Circuits **(100% instructor & course rating from a 77 student class – ECE dept. record)**
Winter 2014: ECE 203 – Biomedical Integrated Circuits and Systems (98% instructor rating)
Spring 2013: ECE 283 – Biomedical Integrated Circuits and Systems (99% instructor rating)
Winter 2013: ECE 165 – Digital Integrated Circuits (94% instructor rating)

Massachusetts Institute of Technology Cambridge, MA

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Teaching Assistant
Spring 2010: MIT EECS Course 6.776 – High Speed Communication Circuits.

Funding

Energy-Efficient Microsystems Lab

As PI of the Energy-Efficient Microsystems Lab, I have raised over $40MM for research at UCSD from the following sources:

- DARPA
- NIH
- NSF
- The Arnold and Mabel Beckman Foundation
- Semiconductor Research Corporation
- ONR
- iARPA
- Army Research Lab
- KETI
- NextFlex
- The Fetzer Franklin Fund
- The Hellman Foundation
- Samsung
- Qualcomm
- Dockon Inc.
- Mouthsense Inc.
- Peregrine Semiconductor
- IMA Life North America
- Moore Foundation
- University of California Multi-Campus Research Programs and Initiatives
- California Energy Commission
- The UCSD Center for Brain Activity Mapping
- The UCSD Center for Wireless Communications (corporate sponsored)
- The UCSD Center for Wearable Sensors (corporate sponsored)
- The Power Management Integration Center (corporate sponsored)

UC San Diego Center for Wearable Sensors

As co-director of the Center for Wearable Sensors, I have been instrumental in fundraising over $7MM from corporate partners, with the bulk of this funding used to support collaborative

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efforts across six engineering departments, the School of Medicine, and the Department of Visual Arts.

Power Management Integration Center

As Site Director of the Power Management Integration Center, I have help recruit corporate members to support research at both UCSD and at Dartmouth College.

Service

Journal service

- Guest Editor – *IEEE Open Journal of the Solid-State Circuits Society (OJ-SSCS) Special Issue on Low-Power RF Circuits and Systems (2023)*
- Guest Editor – *IEEE Journal of Solid-State Circuits* Special Issue on the 2018 *International Solid-State Circuits Conference (ISSCC) (2018)*
- Associate Editor – *IEEE Solid-State Circuits Letters* (2017-2023)
- Associate Editor – *IEEE Transactions on Biomedical Circuits & Systems* (2013-2023)
- Associated Editor – *IEEE Transactions on VLSI* (2015-2017)
- Guest Editor – *IEEE TBioCAS Special Issue on the 2014 International Solid-State Circuits Conference (ISSCC) (December, 2014)*
- Guest Editor – *IEEE TBioCAS Special Issue on the 2013 International Solid-State Circuits Conference (ISSCC) (December, 2013)*

Conference service

- Executive Committee member – Demo Chair – *IEEE International Solid-State Circuits Conference (ISSCC)* (2022-present)
- Technical Program co-Chair – *IEEE Sensor Interfaces Meeting* (2022-2024)
- Subcommittee Chair – Power Management – *IEEE Custom Integrated Circuits Conference (CICC)* (2021-2023)
- Technical Program Committee member – *IEEE VLSI Circuits Symposium* (2018-2022)
- International Technical Program Committee member – *IEEE International Solid-State Circuits Conference (ISSCC)* Technology Directions subcommittee (2017-2022)
- Technical Program Committee member – *IEEE Custom Integrated Circuits Conference (CICC)* (2017-2023)
- Technical program committee – *IEEE Biomedical Circuits and Systems Conference (BioCAS)* (2014-2015)
- Session chair – *International Symposium on Low-Power Electronics and Design (ISLPED)* (2014)
- Technical program committee - *CMOS Emerging Technologies Research Symposium* (2013-2016)

Peer reviewer (2009-present)

- IEEE *Journal of Solid-State Circuits* (JSSC)
- IEEE *Transactions on Circuits and Systems I (T-CAS I)*
- IEEE *Transactions on Circuits and Systems II (T-CAS II)*
- IEEE *Transactions on Microwave Theory and Techniques* (T-MTT)
- IEEE *Sensors Journal*
- IEEE *Transaction on Power Electronics*

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- *Journal of Low Power Electronics and Applications* (JLPEA)
- IET *Circuits, Devices & Systems*
- IEEE *International Conference on Ultra-Wideband* (ICUWB)
- IEEE *Transactions on Biomedical Circuits & Systems (TBioCAS)*
- IEEE *Transactions on Biomedical Engineering* (TBME)
- IEEE *International Conference on Circuits and Systems* (ISCAS)
- IEEE *Biomedical Circuits and Systems Conference* (BioCAS)
- IEEE *Journal of Emerging and Selected Topics in Power Electronics*
- IEEE *Transactions on Industrial Electronics*
- *Nature Nanotechnology*
- *Advanced Materials*
- *Nature Biomedical Engineering*
- *Science Advances*

Grant review service

- NSF SenSE panel reviewer (July 2020)
- NSF ECCS panel reviewer (February 2019)
- NSF ECCS panel reviewer (January 2018)
- NSF ECCS panel reviewer (March 2015)
- ARL ARL Director's Research Initiative (DRI) reviewer (June 2015)

UCSD Campus-wide Service

- Chair, Academic Senate Faculty Affairs Committee (2024-present)
- Co-Director – *Center for Wearable Sensors* – including 23 faculty across four engineering departments, the School of Medicine, and Arts and Humanities (Department of Visual Arts). Funding comes from the membership of 6-10 corporate partners. (2014-present)
- Site Director – *Power Management Integration Center* – includes 5 faculty across multiple engineering departments. Funding comes from the membership of 8-12 corporate partners. (2021-present)
- Vice Chair Academic Senate Faculty Affairs Committee (2023-2024)
- Chair, UCSD Academic Senate Awards Committee (2020-2022)
- Member, UCSD Academic Senate Awards Committee (2018-2020)
- Member, Office of Research Affairs Center Launch Review Panel. (2017-2018)
- Member, UCSD School of Public Health Advisory Committee (2017-2019)
- UCSD representative on Capitol Hill – presented to congressional staffers via an event hosted by the American Institute for Medical and Biological Engineering, then met, alongside UCSD's Executive Director of Government Research Relations, with the offices of three San Diego Congressmen and one California Senator to discuss research at UCSD. (2017)
- Faculty representative, Campus-wide commencement ceremony (2017)
- Organizer & presenter, KAIST-UCSD Symposium on Micro/Nanotechnologies and Electronics for Next-Generation Mobile, Wearable, and IoT Systems, Deajeon, Korea (2015)
- Faculty representative, Welcome Week Convocation Ceremony (2013)

UCSD ECE Departmental Service

- Vice Chair, ECE Department (2024-present)
- Member, Faculty search committee, Systems Focus (2024)
- Adhoc committee member, faculty review files (2x in 2024)
- Chair, ECE Faculty Awards Committee (2023-present)

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- Chair, ECE Admissions Steering Committee (2020-2022)
- Member, ECE Admissions Committee (2019-present)
- Medical Devices and Systems curriculum advisor (2018-2020)
- ECE 50th Anniversary planning committee (2015-2016)
- MS Exam committee (2014-present)
- Alumni Imitative (2014-2020)
- Undergraduate/Graduate Affairs and Student Award Nomination committee (2012-2014)
- Medical Devices and Systems curriculum director (2013-2014)
- Medical Devices and Systems Ad-hoc committee - responsible for creating a new program in this area (2012-2013)

Co-Chair, Microsystem Technology Lab Annual Research Conference (2011)

Annual research conference with over 200 academic and industrial attendees. Responsible for steering committee leadership and conference organization including: solicitation of papers, managing paper edits, keynote speaker invitation, opening and closing remarks, and general planning. Created interactive attendee activities to solicit social and technical engagement amongst industry members and students. Cited by a high-ranking industry member as "the best student run conference in the country".

Broader Impacts & Outreach

- Presented a webinar at BioXTech, a country-wide club founded and run by high school women interested in the intersection of biology and technology, and answered questions about technology and gave career advice (2023)
- Featured in the publication entitled "Building Blocks for Better Science: Case Studies in Low-Cost and Open Tools for Science", which describes my work in low-cost COVID-19 symptoms monitoring devices (2020)
- Guest instructor at Hands-on-Technology summer camp at Wangenheim Middle School focused on accelerating the understanding of computer science in elementary and school-aged children (2014-present)
- Directly mentored ten B.S., M.S., and Ph.D. students from historically underrepresented backgrounds, including two high school students (2012-present)
- Directly mentored two high school students from historically underrepresented backgrounds (2013, and 2016-2017)
- Keynote speaker at ENSPIRE: one of the largest outreach at UCSD, where over 300 middle-school children visit UCSD to learn about higher education and engineering (Feb. 2015)

Press Articles

Prof. Mercier's work across several different projects and his expert opinion have been featured in hundreds of press articles and in other forms of media (e.g., TV and radio). A few select articles/videos are shown below.

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