Johan J. Estrada-López

Department of Physics and Engineering
Westmont College
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RESEARCH OVERVIEW

My research focuses on developing novel and efficient electronic circuits and systems for power management, energy harvesting, and analog signal processing. Specifically, my interests includes Internet of Things applications and smart wireless sensors developed for diverse applications such as agriculture, wearables, and environmental monitoring.

EDUCATION

Ph.D. Electrical Engineering | Texas A&M University | 2019
Dissertation: Circuits and Systems for Energy Harvesting and Internet of Things Applications.
Advisor: Dr. Edgar Sanchez-Sinencio.

M.S. Electrical Engineering | CINVESTAV-GDL | 2003
Thesis: Design of a 1.5-GHz Low-Noise Amplifier in 0.6-μm Technology.
Advisor: Dr. Federico Sandoval-Ibarra.

B.S. Electrical Engineering | Instituto Tecnológico de Mérida | 2001

PROFESSIONAL EXPERIENCE

Associate Professor | Westmont College | Jan 2022 – Present
Physics and Engineering Department

Professor | Universidad Autónoma de Yucatán | Jan 2020 – Dec 2021
Computer Engineering Department

Postdoctoral Researcher | Texas A&M University | May 2019 – Dec 2019
Research on power management and energy harvesting integrated circuits

Power Delivery Intern | Intel Corporation | May 2017 – Aug 2017
Analysis, simulation and design of fully integrated DC-DC switching converters applications

Layout Engineer | Vidatronic Inc. | Aug 2011 – Jan 2013
Integration and maintenance of power management IP in 130nm and 110nm technologies

Associate Professor | Universidad Autónoma de Yucatán | Sep 2006 – Aug 2014
Integration and maintenance of power management IP in 130nm and 110nm technologies

Adjunct Professor | Universidad Tecnológica Metropolitana | Sep 2004 – Aug 2006
Professor, Industrial Division Department

Adjunct Professor | Instituto Tecnológico de Mérida | Jan 2004 – Aug 2006
Department of Electrical Engineering

PROFESSIONAL TRAINING AND DIPLOMAS

An Introduction to Evidence-Based Undergraduate STEM Teaching
Center for the Integration of Research, Teaching and Learning
Summer 2019
Texas A&M University. College Station, TX. USA

Writing & Designing NSF Proposals Workshop
Grant Training Center
October 5, 2015
Texas A&M University. College Station, TX. USA

Power Management Course
MEAD Education
August 24-28, 2015
École Polytechnique Fédérale Lausanne. Lausanne, Switzerland

Introduction to Analog Integrated Circuit Design
Abril 2002
Iberchip International Workshop
Guadalajara, Jalisco, México

TEACHING EXPERIENCE

Universidad Autónoma de Yucatán

Electronic Circuits I	Fall 2020
Electronic Circuits II	Spring 2020
Digital Systems I	Taught 4 times, last in Fall 2020
Analog Microelectronics	Spring 2010
Semiconductor Devices	Fall 2009
Control Systems	Fall 2008
Electric Circuits	Taught 7 times, last in Spring 2014
Electronics II	Taught 5 times, last in Spring 2014
VLSI Design II	Taught 3 times, last in Spring 2012
VLSI Design I	Taught 3 times, last in Fall 2011
Sensors and Actuators	Fall 2007
Biomedical Instrumentation	Spring 2007
Electronics I	Taught 6 times, last in Fall 2013

Universidad Tecnológica Metropolitana

Transformers and Induction Motors	Taught 2 times, last in Fall 2005
Synchronous and DC Machines	Spring 2005
Informatics III	Taught 2 times, last in Summer 2006
Electric Circuits	Spring 2006
Electric Circuit Analysis II	Summer 2006

⋯ PUBLICATIONS

Peer-Reviewed Journal Articles

1. G. G. Garayar-Leyva, H. Osman, **J. J. Estrada-López**, and O. Moreira-Tamayo, "Skew-Circulant-Matrix-Based Harmonic-Canceling Synthesizer for BIST Applications," *Sensors*, vol. 22, no. 8, p. 2884, Apr. 2022, doi: 10.3390/s22082884.

2. A. Hernández-Benítez, A. Balam, J. Vázquez-Castillo, **J. J. Estrada-López**, et al., "An ultra-low-power strain sensing node for Long-Range wireless networks in carbon nanotube-based materials," in *IEEE Sensors Journal*, doi: 10.1109/JSEN.2022.3162988.

3. A. Castillo-Atoche, K. Caamal-Herrera, R. Atoche-Enseñat, **J. J. Estrada-López**, et al., "Energy Efficient Framework for a AIoT Cardiac Arrhythmia Detection System Wearable during Sport," *Applied Sciences*, vol. 12, no. 5, p. 2716, Mar. 2022, doi: 10.3390/app12052716.

4. J. Vázquez-Castillo, A. Castillo-Atoche, **J. J. Estrada-López**, et al., "Energy-Saving Techniques for Urban Noise WSN With Kalman-Based State Estimation and Green Facade Energy Harvester," in IEEE Transactions on Instrumentation and Measurement, vol. 71, pp. 1-10, 2022, Art no. 9502110, doi: 10.1109/TIM.2022.3145385.

5. Z. Zeng, **J. J. Estrada-López**, B. Wang and E. Sánchez-Sinencio, "A CMOS Energy Harvesting Interface Circuit With Cycle-to-Cycle Frequency-to-Amplitude Conversion MPPT for Centimeter-Scale Wind Turbine," in *IEEE Transactions on Circuits and Systems I: Regular Papers*, doi: 10.1109/TCSI.2021.3087790

6. A. Castillo-Atoche, J. Vázquez-Castillo, E. Osorio-de-la-Rosa, J. Heredia-Lozano, J. Avilés Viñas, R. Quijano Cetina, **J. J. Estrada-Lopez**, "An Energy-Saving Data Statistics-Driven Management Technique for Bio-Powered Indoor Wireless Sensor Nodes," in *IEEE Transactions on Instrumentation and Measurement*, vol. 70, pp. 1-10, 2021, Art no. 9507010, doi: 10.1109/TIM.2021.3063187

7. J. Riad, S. Soto-Aguilar, **J. J. Estrada-López**, O. Moreira-Tamayo, and E. Sánchez-Sinencio, "Design Trade-Offs in Common-Mode Feedback Implementations for Highly Linear Three-Stage Operational Transconductance Amplifiers," *Electronics*, vol. 10, no. 9, p. 991, Apr. 2021

8. J. Riad, **J. J. Estrada-López**, I. Padilla-Cantoya and E. Sánchez-Sinencio, "Power-Scaling Output-Compensated Three-Stage OTAs for Wide Load Range Applications," in *IEEE Transactions on Circuits and Systems I: Regular Papers*, vol. 67, no. 7, pp. 2180-2192, July 2020, DOI: 10.1109/TCSI.2020.2978515

9. A. Abuellil, **J. J. Estrada-López**, A. Bommireddipalli, A. Costilla-Reyes, Z. Zeng and E. Sánchez-Sinencio, "Multiple-Input Harvesting Power Management Unit with Enhanced Boosting Scheme for IoT Applications," in *IEEE Transactions on Industrial Electronics*, vol. 67, no. 5, pp. 3662-3672, May 2020, DOI: 10.1109/TIE.2019.2920607

10. A. Sanabria-Borbón, S. Soto-Aguilar, **J. J. Estrada-López**, D. Allaire, and E. Sánchez-Sinencio, "Gaussian-Process-Based Surrogate for Optimization-Aided and Process-Variations-Aware Analog Circuit Design," *Electronics*, vol. 9, no. 4, p. 685, Apr. 2020. http://dx.doi.org/10.3390/electronics9040685

11. **J. J. Estrada-López**, A. Abuellil, A. Costilla-Reyes, M. Abouzied, S. Yoon and E. Sánchez-Sinencio, "A Fully Integrated Maximum Power Tracking Combiner for Energy Harvesting IoT Applications," in *IEEE Transactions on Industrial Electronics*, vol. 67, no. 4, pp. 2744-2754, April 2020, DOI: 10.1109/TIE.2019.2907449

12. Z. Zeng, **J. J. Estrada-López**, M. A. Abouzied and E. Sánchez-Sinencio, "A Reconfigurable Rectifier with Optimal Loading Point Determination for RF Energy Harvesting From −22 dBm to −2 dBm," in *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 67, no. 1, pp. 87-91, Jan. 2020, DOI: 10.1109/TCSII.2019.2899338

13. J. Riad, **J. J. Estrada-López**, and E. Sánchez-Sinencio, "Classification and Design Space Exploration of Low-Power Three-Stage Operational Transconductance Amplifier Architectures for Wide Load Ranges," *Electronics*, vol. 8, no. 11, p. 1268, Nov. 2019. http://dx.doi.org/10.3390/electronics8111268

14. **J. J. Estrada-López**, A. A. Castillo-Atoche and E. Sanchez-Sinencio, "Design and Fabrication of a 3-D Printed Concentrating Solar Thermoelectric Generator for Energy Harvesting Based Wireless Sensor Nodes," in *IEEE Sensors Letters*, vol. 3, no. 11, pp. 1-4, Nov. 2019, DOI: 10.1109/LSENS.2019.2948811

15. A. Costilla Reyes, A. Abuellil, **J. J. Estrada-López**, S. Carreon-Bautista and E. Sánchez-Sinencio, "Reconfigurable System for Electromagnetic Energy Harvesting with Inherent Activity Sensing Capabilities for Wearable Technology," in *IEEE Transactions on Circuits and Systems II: Express Briefs*, vol. 66, no. 8, pp. 1302-1306, Aug. 2019, DOI: 10.1109/TCSII.2018.2884613

16. **J. J. Estrada-López**, A. A. Castillo-Atoche, J. Vázquez-Castillo and E. Sánchez-Sinencio, "Smart Soil Parameters Estimation System Using an Autonomous Wireless Sensor Network With Dynamic Power Management Strategy," in *IEEE Sensors Journal*, vol. 18, no. 21, pp. 8913-8923, 1 Nov.1, 2018, DOI: 10.1109/JSEN.2018.2867432

17. **J. Estrada-López**, A. Abuellil, Z. Zeng, and E. Sánchez-Sinencio, "Multiple Input Energy Harvesting Systems for Autonomous IoT End-Nodes," *Journal of Low Power Electronics and Applications*, vol. 8, no. 1, p. 6, Mar. 2018. http://dx.doi.org/10.3390/jlpea8010006

18. F. López-Huerta, **J. J. Estrada-López,** A. L. Herrera-May, *et al.* "Experimental performance analysis of a CMOS amplifier considering different layout techniques," *Analog Integr Circ Sig Process* **78**, 799–806 (2014). https://doi.org/10.1007/s10470-013-0202-z

19. F. López-Huerta, R. M. Woo-Garcia, M. Lara-Castro, **J. J. Estrada-López**, A. L. Herrera-May, "An Integrated ISFET pH Microsensor on a CMOS Standard Process," in *Journal of Sensor Technology*, vol. 3, no. 3, 2013, DOI: 10.4236/jst.2013.33010

20. F. López-Huerta, **J. Estrada-López**, M. Linares, C. Zúñiga, Blanca Soto-Cruz, "Study and comparison of CMOS layouts for applications in analog circuits," in *Journal of Scientific & Industrial Research*, vol. 71, pp. 257-261, April 2012

21. F. López-Huerta, A. L. Herrera-May, **J. J. Estrada-López**, C. Zuñiga-Islas, B. Cervantes-Sanchez, E. Soto, and B. S. Soto-Cruz, "Alternative Post-Processing on a CMOS Chip to Fabricate a Planar Microelectrode Array," *Sensors*, vol. 11, no. 11, pp. 10940–10957, Nov. 2011. http://dx.doi.org/10.3390/s111110940

Peer-Reviewed Conference Proceedings

1. G. G. Garayar-Leyva, **J. J. Estrada-López** and O. Moreira-Tamayo, "Square-Wave-Based Multi-Tone Generator for Sleep-Improving Brain Stimulation," *2021 IEEE International Midwest Symposium on Circuits and Systems (MWSCAS)*, 2021, pp. 133-136, doi: 10.1109/MWSCAS47672.2021.9531755.

2. G. G. Garayar-Leyva, H. Osman, **J. J. Estrada-López** and E. Sánchez-Sinencio, "A Harmonic-Canceling Synthesizer using Skew-Circulant-Matrix-Based Coefficient Generator," *2020 IEEE International Symposium on Circuits and Systems (ISCAS)*, Sevilla, 2020, pp. 1-5, DOI: 10.1109/ISCAS45731.2020.9181146

3. Z. Zeng, S. P. Shen, B. Wang, **J. J. Estrada-López**, R. Murch, and E. Sánchez-Sinencio, "An Ultra-low-power Power Management Circuit with Output Bootstrapping and Reverse Leakage Reduction Function for RF Energy Harvesting," in *IEEE/MTT-S Int'l. Microwave Symposium*, June 2020

4. **J. J. Estrada-López**, A. Abuellil, A. Costilla-Reyes and E. Sánchez-Sinencio, "Technology Enabling Circuits and Systems for the Internet-of-Things: An Overview," *2018 IEEE International Symposium on Circuits and Systems (ISCAS)*, Florence, 2018, pp. 1-5, DOI: 10.1109/ISCAS.2018.8351876

5. C. Gongora-Martín, A. Castillo-Atoche A., **J. Estrada-López**, J. Vázquez-Castillo, J. Ortegón-Aguilar and R. Carrasco-Álvarez, "Hybrid FPGA/ARM Co-design for Near Real Time of Remote Sensing Imagery," in E. Bayro-Corrochano, E. Hancock (eds) *Progress in Pattern Recognition, Image Analysis, Computer Vision, and Applications. CIARP 2014. Lecture Notes in Computer Science*, vol 8827. Springer, Cham. https://doi.org/10.1007/978-3-319-12568-8_126

6. A. Castillo Atoche, **J. Estrada-López**, R. Quijano Cetina, L. Rizo, "Efficient design of bit-level accelerator architectures for the DEDR-RASF remote sensing algorithm using super-systolic arrays," in *PECCS 2012 - Proceedings of the 2nd International Conference on Pervasive Embedded Computing and Communication Systems* (2012)

7. J. V. Castillo, L. Vela-Garcia, R. Parra-Michel, A. C. Atoche and **J. Estrada-López**, "High-speed low-power parallel Random Number Generator for wireless channel emulators," *2012 IEEE 3rd Latin American Symposium on Circuits and Systems (LASCAS)*, Playa del Carmen, 2012, pp. 1-4, DOI: 10.1109/LASCAS.2012.6180346

8. Francisco L.H., **Johan E.L.**, Leobardo H.M.A., Carlos Z.I., Susana S.C. "Distribución de la Densidad de Corriente e Impedancia de Materiales Alternativos en Microelectrodos Mediante el análisis de Elemento Finito," Folgueras Méndez J. et al. (eds) *V Latin American Congress on Biomedical Engineering (CLAIB) 2011*, Habana, Cuba, May 16-21, 2011, IFMBE Proceedings, vol 33. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-642-21198-0_248

9. R. M. Woo García; F. López Huerta; B. S. Soto Cruz; **J. J. Estrada López,** "Design of an Integrated CMOS Instrumentation Amplifier for Biomedical Applications," *1st International Congress on Instrumentation and Applied Sciences*. Cancún, Quintana Roo, México. October 26-29, 2010

10. **J. Estrada-López**, R. Atoche-Enseñat, "Avances del Instituto Tecnológico de Mérida en la Enseñanza e Investigación en Microelectrónica," *14th International Workshop Iberchip (IWS-2008)*. Puebla, México. February 20-22, 2008.

11. A. Collí-Menchi, E. Gaxiola-Sosa, H. Pinto-Ávila, **J. Estrada-López**, "A Low-Cost Interferential Current Stimulator for Physical Therapy," *13th International Workshop Iberchip (IWS-2007)*. Lima, Perú. March 14-16, 2007.

12. **J. Estrada López**, F. Sandoval-Ibarra, "Introducing Digital IC Design and Test to Undergraduate Students," *12th International Workshop Iberchip (IWS-2006)*. San José, Costa Rica. March 22-24, 2006

13. A. Castillo-Atoche, J. Vázquez-Castillo, R. Atoche-Enseñat, **J. Estrada López**, "Ethernet/Internet Control of Modular Production Systems with Embedded Microcontrollers," *12th International Workshop Iberchip (IWS-2006)*. San José, Costa Rica. March 22-24, 2006

14. R. Atoche-Enseñat, L. A. Muñoz-Ubando, A. Sebastiá-Cortés, **J. J. Estrada López**, "Inicialización Automática de Pose: Nuevos Resultados Utilizando FPGA's para el Registro y Apareamiento del Modelo," *12th International Workshop Iberchip (IWS-2006)*. San José, Costa Rica. March 22-24, 2006

Book Chapters

1. A. Castillo-Atoche, **J. J. Estrada-López**, P. Pérez-Muñoz and S. Soto-Aguilar (2011). *High-Speed VLSI Architecture Based on Massively Parallel Processor Arrays for Real-Time Remote Sensing Applications*, in Applications of Digital Signal Processing, Dr. Christian Cuadrado-Laborde (Ed.), ISBN: 978-953-307-406-1, InTech. DOI: 10.5772/26496

Invited Talks and Tutorials

1. *Battery Life Extension Techniques for Energy Harvesting Based IoT Device*. Latin-American Symposium on Circuits and Systems. Santiago, Chile / Virtual. March 2022.
2. *Energy Harvesting for Smart Wearable Devices*. 2da reunión internacional de tecnologías emergentes en ingeniería. Chetumal, Quintana Roo. December 2021.
3. *Energy Harvesting and Power Management Techniques for Lifetime Extension of IoT Wireless Sensors*. Symposium on Electronic Systems and Materials. Boca del Río, Veracruz, México. November 2020.

Thesis

1. **J. J. Estrada-López**, "Circuits and Systems for Energy Harvesting and Internet of Things Applications," *PhD. Dissertation*, Texas A&M University, Department of Electrical Engineering, 2019
2. Mildred C. Góngora Martín, "Implementación VLSI de la raíz para el cálculo de la matriz inversa," *M.S. Thesis*, Universidad Autónoma de Yucatán, 2015
3. Irving M. Tolosa Garma, "Detector de esquinas en tiempo real implementado en arquitectura SIMD para sistema autónomo de captura de imágenes," *M.S. Thesis*, Universidad Autónoma de Yucatán, 2015
4. Sergio Soto Aguilar, "Implementación en VLSI de un generador de números aleatorios uniformes de 64 bits de alta velocidad," *B.S. Thesis*, Universidad Autónoma de Yucatán, 2013
5. Pedro. F. Pérez Muñoz, "Arquitectura VLSI basada en múltiples arreglos de procesadores para la evaluación de polinomios," *B.S. Thesis*, Universidad Autónoma de Yucatán, 2012
6. **J. J. Estrada-López**, "Design of a 1.5-GHz Low-Noise Amplifier in 0.6-µm Technology," *M.S. Thesis*, Centro de Investigación y Estudios Avanzados del IPN, Unidad Guadalajara, 2003

⋯ PROFESSIONAL SERVICE

Membership

Member, Institute of Electrical and Electronics Engineers (IEEE)

Funding Agency Proposal Review

Consejo Nacional de Ciencia y Tecnología, 2022 (1 proposal)

Reviewing (Journals and Conferences)

- IEEE Journal of Solid-State Circuits
- IEEE Sensors Journal
- IEEE Sensors Letters
- IEEE Transactions on Circuits and Systems I: Regular Papers
- IEEE Transactions on Circuits and Systems II: Express Briefs
- IEEE Transactions on Industrial Electronics
- IEEE Transactions on Very Large Scale Integration Systems
- IEEE Transactions on Power Electronics
- IEEE World Forum on Internet of Things (WFIoT)
- Electronics (MDPI)
- Energies (MDPI)
- Future Internet (MDPI)
- Journal of Sensor and Actuator Networks (MDPI)
- Sensors (MDPI)
- Sustainability (MDPI)

- International Journal of Distributed Sensor Networks (SAGE)
- AEÜ - International Journal of Electronics and Communications (Elsevier)

Local Arrangements Co-Chair

3rd Circuits and Systems for Medical and Environmental Applications Workshop (2012)

2nd Circuits and Systems for Medical and Environmental Applications Workshop (2010)

1st NHI/IEEE Circuits and Systems for Medical and Environmental Applications Workshop (2009)

Technical Support Group

8th International Workshop Iberchip (2002)