Ali Fotowat, Ph.D.

IC Designer with RF specialty Communication system, and hardware designer

Biography

Ali Fotowat-Ahmady was born in Tehran, Iran, in 1958. He received the B.S. degree from the California Institute of Technology, Pasadena, CA, USA, in 1980, and the M.S. and Ph.D. degrees in electrical engineering from Stanford University, Stanford, CA, USA, in 1982 and 1991, respectively. He started his career at Philips Semiconductor in Sunnyvale, CA, USA, in 1987 where he developed several integrated circuits for mobile phones. In 1991 he joined the Electrical Engineering Department of Sharif University of Technology, Tehran, Iran. His research interests include advanced integrated circuits for energy savings and communication applications. Due to his interests in entrepreneurial engineering, he has been the co-founder of several companies and continues advising his students on the same. Dr. Fotowat-Ahmady is a three times recipient of the Kharazmi Science and Engineering Award for his work on low-power microelectronics and communication ICs. He is a member of the IEEE Solid-State Society and has been the adviser of the societys Sharif Electrical Engineering student chapter.

Research Areas

Wireless Systems & ICs

Cognitive radio

Fast spectrum Sensing

4G-LTE-Advanced

M2M Femto-Cells

Advanced RFIDs

UWB tags Broadband antena matching Active tags Multi- Standard RFID reader

WiFi

DSRC (802.11 P) High data rate (802.11 ac) Traffic off-loading

Energy Saving

Advanced LED lamp drivers

Autonomous Cars

Lidar/Radar/Camera fusion

Books:

- [2] "Introduction to Wireless Communication Circuits", Forouhar Farzaneh, Ali Fotowat, Mahmood Kamarei, Ali Nikoofard, Mohammad Elmi, River Publishers, 2018.
- [1] Translation to Persian of "*RF Microelectronics*", Professor Behzad Razavi, Prentice Hall, 2012.

Publications

papers:

- [21] Ehsan Hadizadeh Hafshejani, Nima Taherinejad, Rozhan Rabbani, Shahriar Mirabbasi, Ali Fotowat," Self-aware Data Processing for Power Saving in Resource-Constrained IoT Cyber-Physical Systems," *IEEE Sensors Journal PP(99):1-1*, DOI:10.1109/JSEN.2021.3133405 December 2021
- [20] C. Patrick Yue, Hossein Shirinabadi, Wang Li, Milad Kalantari, Ali Fotowat," A W-Band Single-Antenna FMCW Radar Transceiver With Adaptive Leakage Cancellation," *IEEE Journal of Solid-State Circuits*, PP(99):1-1DOI:10.1109/JSSC.2020.3032677, November 2020
- [19] Mohammad Elmi, Ehsan Hadizadeh, Nima Taherinejad, Shahriar Mirabbasi, Ali Fotowat," A Low-Power Signal-Dependent Sampling Technique: Analysis, Implementation, and Applications" *IEEE Transactions on PP(99):1-14*, Circuits and Systems I: Regular Papers, DOI:10.1109/TCSI.2020.3021290, September 2020
- [18] C. Patrick Yue, Ali Fotowat, Hossein Shirinabadi, Milad Kalantari," 4.7 A Single-Antenna W-Band FMCW Radar Front-End Utilizing Adaptive Leakage Cancellation," *IEEE International Solid- State Circuits Conference (ISSCC)*, DOI:10.1109/ISSCC19947.2020.9063129, February 2020
- [17] Zahra Kavehvash, Morteza Fayazi, Ali Fotowat," A Simplified Approach to Two-Port Analysis in Feedback," August 2019
- [16] Ali Fotowat , Zohreh Azizi, Rozhan Rabbani, Ehsan Hadizadeh," Ultra Low-Power System for Remote ECG Monitoring, "March 2019

- [15] Milad Kalantari, Xiangyu Meng, Ali Fotowat-Ahmady, C Patrick Yue," A Tunable Reflection/Transmission Coefficient Circuit Using a 45° Hybrid Coupler with Two Orthogonal Variables," *IEEE Transactions on Microwave Theory and Techniques PP(99):1-10,* International Solid-State Circuits Conference (ISSCC), DOI:10.1109/TMTT.2019.2895578, February 2019
- [14] Hossein Shirinabadi, Milad Kalantari, Ali Fotowat-Ahmady, Ali Banai," Optimum design of high power and high efficiency mm-wave fundamental oscillators, International Journal of Circuit Theory and Applications," *International Journal of Circuit Theory and Applications 46(10)*, DOI:10.1002/cta.2503, July 2018
- [13] Maryam Gharaei Jomehei, Samad Sheikhaei, Ali Fotowat-Ahmady, Behjat Forouzandeh," A comprehensive survey on UHF RFID rectifiers and investigating the effect of device threshold voltage on the rectifier performance, Analog Integrated Circuits and Signal Processing 96(10)DOI:10.1007/s10470-018-1208-3, Springer, July 2018
- [12] Authors: G Zare Fatin, Ziaddin Daei Koozehkanani, Ali Fotowat-Ahmady, Jafar Sobhi, Ronan Farrell," Design of a reconfigurable front-end for a multistandard receiver for the frequency range of 800 MHz to 2.5 GHz," International Journal of Circuit Theory and Applications 46(5)DOI:10.1002/cta.2476, April 2017
- [11] Massoud Tohidian, Robert Bogdan Staszewski, Ali Fotowat Ahmady, Seyed Amir Reza Ahmadi Mehr, Mahmoud Kamarei, Fabien Ndagijimana," Quadrature LC tank digitally controlled ring oscillator," Feb 2017
- [10] Haeri, A. A. R., Karkani, M. G., Sharifkhani, M., Kamarei, M., & Fotowat-Ahmady, A. "Analysis and design of power harvesting circuits for ultra-low power applications," *IEEE Transactions on Circuits and Systems I: Regular Papers, 64(2), 471-479.* October 2016
- [9] Nikoofard, Ali, Siavash Kananian, and Ali Fotowat-Ahmady," Off-Resonance Oscillation, Phase Retention, and Orthogonality Modeling in Quadrature Oscillators." *IEEE Transactions on Circuits and Systems I: Regular Papers 63.6 (2016): 883-894.* June 2016
- [8] Fatemi, S.M., Sharifkhani, M., Fotowat-Ahmady, A., "A Unified Solution for Super-Regenerative Systems With Application to Correlator-Based UWB Transceivers," *IEEE Transactions on Circuits and Systems I: Regular Papers,* vol.62, no.4, pp.1033,1041, Apr 2015
- [7] V.Mirmoghtadayi, A.Fotowat-Ahmady, A.Zeidabadinejad, "A 90nm CMOS IR-UWB BPSK Transmitter with Spectrum Tunability to Improve Peaceful UWB- Narrowband Coexistance", *IEEE Transactions on CASI, Volume PP, pp.1-13, Issue 99*, Jun 2014

- [6] M.Marvi, A.Fotowat-Ahmady, S. Kananian, A. Zabetian, "A Low Distortion Self-Oscillating Power Factor Correction Circuit for LowCost Applications", *IEEE Transactions on Industrial Electronics, Volume PP, Issue 99*, March 2014.
- [5] Z.Vahidpoor, A.Fotowat-Ahmady, K.Forooraghi, Z.Atlasbaf "A New Sepectrum Sensing -Method -Using Output Analysis of the PFD", *IEEE Transactions on Circuits and Systems, Volume 60, no.6, pp.366-370*, June 2013.
- [4] M. Marvi, A.Fotowat-Ahmady, ""A Fully ZVS Critical Conduction Mode Boost PFC", *IEEE Transactions on Power Electronics*, *Volume 27*, *pp.1958 1965*, *Issue 4*, October 2011.
- [3] A.Tabatabaei, A.Fotowat-Ahmady, M.Delurio, S.Navid," "A high slew-rate unity-gain low-voltage buffer with large active/quiescent current ratio"; *IEEE Journal of Solid-State Circuits*, Volume 33, Issue 1, pp.156 163. jan 1998
- [2] A.Tabatabei, A.Fotowat-Ahmady, et.al., "A High-speed High slew-rate low voltage buffer with dual feedback", Brief paper in the *IEEE Journal of Solid-States Circuits*, *JSSC*, Dec 1997
- [1] Behbahani, A.Fotowat-Ahmady, S.Navid, R.Gaethke, M.Delurio, "A low distortion bipolar mixer for low voltage direct up-conversion and high IF systems"; *IEEE Journal of Solid-State Circuits*, Volume 32, Issue 9, Page(s):1446 1450. Sep 1997

IEEE Conference papers:

- [24] Karkani, Mohammad Reza Ghaderi, Mahmud Kamarei, and Ali Fotowat Ahmady. "A low-power smart temperature sensor for passive UHF RFID tags and Sensor nets." Telecommunications (IST), 2016 8th International Symposium on. IEEE, 2016.
- [23] Khorami, Ata, Mahmood Baraani Dastjerdi, and Ali Fotowat Ahmadi. "A low-power high-speed comparator for analog to digital converters." Circuits and Systems (ISCAS), 2016 IEEE International Symposium on. IEEE, 2016.
- [22] Nikoofard, Ali, Siavash Kananian, and Ali Fotowat-Ahmady. "Phase calibration in mutual injection-pulled quadrature oscillators." Circuits and Systems (MWSCAS), 2015 IEEE 58th International Midwest Symposium on. IEEE, 2015.
- [21] A. Nikoofard, S. Kananian, A. Fotowat-Ahmady, "Analysis of the Effects of Clock Imperfections in N-Path Filters", Accepted for presentation at NEWCAS'2015.
- [20] A. Nikoofard, S. Kananian, B. Behmanesh, S. M. Atarodi, A. Fotowat-Ahmady, "Analysis of the effects of non-idealities on N-phase high-Q band-pass filters", Accepted for presentation at ISCAS'2015.

- [19] V.Mirmoghtadayi, A.Fotowat-Ahmady, A.Zeidabadinejad, "A New IR-UWB Pulse to Mitigate Coexistence Isues of UWB and Narrowband Systems" 21st Iranian Conference on Electrical Engineering, Mashhad, Iran, 2013.
- [18] H.Jalili, A. Fotowat-Ahmady, M.Jenabi, "A 1-mW current reuse quadrature RF front-end for GPS L1 band in 0.18µm CMOS", Electronics, Circuits and Systems (ICECS), 2012 19th IEEE International Conference on, Seville, Seville, 2012.
- [17] A.Jalili, A.Fotowat-Ahmadi, "A low-power current reuse CMOS RF front-end for GPS applications", IEEE International Conference on RF and Microwave (RFM), Malaysia, 2012.
- [16] M.Tohidian, A.Fotowat-Ahmady, Kamarei, "High-swing class-C VCO", Proceedings of the ESSCIRC (ESSCIRC), Helsinki, Finland, 2011.
- [15] H.Hedayati, F.Arvani, Noshad, V.Mirmoghtadayi, A.Fotowat-Ahmady, "Design of an optical UWB pulse leading to an in-band interference tolerant impulse radio UWB transceiver", IEEE International Conference on Ultra-Wideband (ICUWB), Italy, 2011.
- [14] V.Mir-Moghtadaei, A.Jalili, A.Fotowat-Ahmady, A.Z.Nezhad and H.Hedayati, "A new UWB pulse generator for narrowband interference avoidance", in Proceedings of the 15th IEEE Mediterranean Electrotechnical Conference MELECON. Valletta 2010.
- [13] K.Ramezanpour, B.H.Khalaj, and A.Fotowat-Ahmady, "Reduction of multipath errors in spread-spectrum code tracking", in IEEE International Conference on Communications. Cape Town 2010
- [12] M.Tohidian, A.Fotowat-Ahmady, and M.Kamarei, "A simplified method for phase noise calculation", in Proceedings of the IEEE Custom Integrated Circuits Conference, 2009.
- [11] Y.Koolivand, Yavari, Shoaie, A.Fotowat-Ahmady, "Low voltage low power techniques in design of zero IF CMOS receivers", in 2009 16th IEEE International Conference on Electronics, Circuits and Systems, ICECS 2009.
- [10] H.Hedayati, A.Fotowat-Ahmady, "A novel tunable UWB pulse design for narrowband interference suppression implemented in BiCMOS technology", in Proceedings IEEE International Symposium on Circuits and Systems. 2009. Taipei.
- [9] V.Roostaie, Najafi, Mohammadi, A.Fotowat-Ahmady, "A low power baseband processor for a dual mode UHF EPC Gen 2 RFID tag", in IEEE International Conference on Design and Technology of Integrated Systems in Nanoscale Era, DTIS'08. 2008. Tozeur
- [8] Najafi, V, Jenabi, Mohammadi, Fotowat, "A dual mode EPC Gen 2 UHF RFID transponder in 0.18um CMOS". in Proceedings of the 15th IEEE International Conference on Electronics, Circuits and Systems, ICECS 2008. 2008. St. Julian's
- [7] M.Jenabi, N.Riahi, A. Fotowat-Ahmady, "A Programmable Fully-Integrated GPS receiver in 0.18um CMOS with Test Circuits"; Design Automation Conference, 2007. ASP-DAC '07. Asia and South Pacific; Jan. 2007 Page(s):80 - 85, Digital Object Identifier 10.1109/ASPDAC.2007. 357796.
- [6] D.Shiri, M.Rajabi, N.Nouri, A.Motieifar, M.Jenabi, A.Parsa, A.Fotowat-Ahmady, "Concurrent dual loop, mixed mode control circuit for 10Gb/s laser diode driver (LDD) IC with 0.13/spl mu/m RF CMOS technology"; Canadian Conference on Electrical and Computer Engineering, 2005. 1-4 May 2005 Page(s):1747 - 1750, Digital Object Identifier 10.1109/CCECE.2005.1557321.
- [5] A.Mehrnia, K.Shakeri, A.Eftekhar, F.Soheili, M.Nassiri, A.Fotowat-Ahmady, "An all digital spread spectrum processor featuring multiplier free zero-IF down-conversion, decimation and multiplexed dispreading"; Proceedings of the 12th International Conference on Microelectronics, 2000. ICM2000. 31 Oct.-2 Nov. 2000 Page(s):363-366, Digital Object Identifier 10.1109/ICM.2000.916478
- [4] K.Shakeri, H.Hashemi, A.Parsa, A, A.Fotowat-Ahmady, R.Rofougaran, "A 1 volt CMOS 2/4 level FSK digital demodulator for pager applications"; 42nd Midwest Symposium on

- Circuits and Systems, 1999. Volume 1, 8-11 Aug. 1999 Page(s):219 222 vol. 1, Digital Object Identifier 10.1109/MWSCAS.1999.867247
- [3] S.Navid, F.Behbahani, A.Fotowat-Ahmady, et.al. LLL, "A New Technique for Broadband Quadrature Signal Generation", IEEE Custom Integrated Circuits Conference, CICC' 97, Santa Clara, CA, U.S.A., paper 20.4, May 5-8, 1997.
- [2] E.Hejazi-Dinan, A.Fotowat-Ahmady, "On the acquisition-time distribution and optimizing the acquisition system performance in spread-spectrum receivers", IEEE 4th International Symposium on Spread Spectrum Techniques and Applications Proceedings, 1996, Volume 1, 22-25 Sept. 1996 Page(s):146 - 150 vol.1, Digital Object Identifier 10.1109/ISSSTA.1996.563759
- [1] C.Marshall, F.Behbahani, W.Birth, A.Fotowat-Ahmady, et.al."2.7 Volt GSM Transceiver ICs with On-Chip Filtering", IEEE International Solid State Circuits Conference (ISSCC95), TA 8.7, pp. 148-149, pp 112-113 & 312, February 1995.

Other Journal papers:

- [11] Jomehei, M. G., Sheikhaei, S., Fotowat-Ahmady, A., & Forouzandeh, B. (2018). "A comprehensive survey on UHF RFID rectifiers and investigating the effect of device threshold voltage on the rectifier performance." Analog Integrated Circuits and Signal Processing, 96(1), 21-38.
- [10] Zare Fatin, G., Koozehkanani, Z. D., Fotowat-Ahmady, A., Sobhi, J., & Farrell, R. (2018). "Design of a reconfigurable front-end for a multistandard receiver for the frequency range of 800 MHz to 2.5 GHz." International Journal of Circuit Theory and Applications.
- [9] Nikoofard, A., Kananian, S., Hadizadeh, E., & Fotowat-Ahmady, A. (2016). "A fully analog side-band cancellation technique in radio-frequency transmitters." Microelectronics Journal, 53, 116-126.
- [8] Fatin, Gholamreza Zare, Mostafa Savadi Osgooei, and Ali Fotowat-Ahmady. "I/Q mismatch calibration of a transmitter using local quadrature oscillator." Microelectronics Journal 55 (2016): 82-91.
- [7] Nikoofard, Ali, Siavash Kananian, and Ali Fotowat-Ahmady." *A fully analog calibration technique for phase and gainmismatches in image-reject receivers.*" AEU-International Journal of Electronics and Communications 69.5(2015): 823-835.
- [6] V.Mirmoghtadayi, A.Fotowat-Ahmady, A.Zeidabadinejad, A.Serdijin "A New IR-UWB Pulse for the Compatibility of IEEE 802.11a WLAN and IR-UWB Systems", Journal of Circuits, systems, and Computers, Volume 23, Issue 2, February 2014
- [5] Zeynab Vahidpoor, Keyvan Forooraghi, Ali Fotowat-Ahmady, Zahra Atlasbaf, "Coplanar waveguide-FED planar spiral antenna with integrated impedance transformer", Microwave and Optical Technology Letters, USA, 2013.
- [4] Z.Vahidpoor, K. Forooraghi, A.Fotowat-Ahmady, Z. Atlasbaf, "Fast adjustable spectrum sensing circuit for cognitive radio applications", International Journal of Circuit Theory and Applications, USA, 2012.
- [3] V.Najafi, S.Moahammadi, A.Fotowat-Ahmady, "A dual mode UHF EPC Gen 2 RFID tag in 0.18μm CMOS", Microelectronics (Elsevier), UK, 2009.
- [2] Jalali, M.Nabavi, Moravvej, FotowatAhmady, "Low-noise differential transimpedance amplifier structure based on capacitor cross-coupled gm-boosting scheme", Microelectronics Journal, 2008. 39(12): p. 1843-1851.
- [1] Jalali, M, Moravvej, Nabavi, FotowatAhmady, "Gm-boosted differential transimpedance amplifier architecture", IEICE Electronics Express, 2007. 4(16): p. 498-503, Express, 2007. 4(16): p. 498-503

Other Conference papers:

- [20] Vahidpoor, Z, Forooraghi, K, Atlasbaf, Z, FotowatAhmadi, A, "A New Spectrum Sensing Circuit for Cognitive Radio Applications", Computational Intelligence, Modelling and Simulation (CIMSiM), 2011 Third International Conference on, Langkawi, Malaysia, 2012.
- [19] Teymouri, H, Fotowat-Amady, A, Nabavi, A, "A new low phase noise LC-tank CMOS cascode Cross-coupled oscillator", 18th Iranian Conference on Electrical Engineering (ICEE), Tehran, Iran, 2010.
- [18] VahidRoostaie, ValiNajafi, SiamakMohammadi, Ali Fotowat-Ahmady, "*Design of a low power digital core for a Dual mode UHF EPC RFID tag*", EWDTS, Yerevan, Armenia, Sep. 7-10 2007.
- [17] Koolivand, Y, Shoaie, Fotowat, Zahabi, Jabbedar, "Nonlinearity analysis in ISD CMOS LNA's Using Volterra series. in Proceedings of the ACM Great Lakes Symposium on VLSI", GLSVLSI. Philadelphia, PA. 2006
- [16] S.Irajpour, A. FotowatAhmady, S. Sheikhaei and S. Sheybani, "Signaling Task and Architecture Partitioning in Implementing a Prototype DECT WLL System", International Symposium on Telecommunications, Tehran, Iran, Sep. 2001.
- [15] H.Hashemi, A. Parsa, K. Shakeri, A. Fotowat, R. Rofougaran, "A 1V 450mW Fully Integrated Bandpass Filter for Pager Applications", European Conference on Circuit Theory and Design, ECCTD1999.
- [14] A.Faghfuri, A.Fotowat, "Performance Evaluator for an ADSL System",1999 Intl. Wireless and Telecom. Symposium, IWTS99, pp 177-180.
- [13] H.Daraabi, A.Fotowat, "Design of a low IF receiver based on integrated filters", Proceedings of ICEE 97, May 7-9 1997.
- [12] S.Navid, A.Fotowat, F.Behbahani, A.Hajimiri, "Level-locked-loop, a new technique for broad band quadrature signal generation", pp. 235-242, Proceedings of ICEE 95, May 15-18 1995.
- [11] B.Goharfar, A.Fotowat, "Nonlinear analysis and prediction of noise figures of cellular phone mixers", Proceedings of ICEE 95, pp. 281-286, May 15-18 1995.
- [10] A.Arefpour, A. Fotowat, "Systematic analysis and design of RF synthesizer IC's", Proceedings of ICEE 95, pp. 251-263, May 15-18 1995.
- [9] A.Khalili-Azad, A.Fotowat, "Design of a transmitter-receiver IF IC with clock and carrier recovery for cellular telephones", Proceedings of ICEE 95, pp.295-304, May 15-18 1995.
- [8] B.Jalai, A.Fotowat, "Parametric device analysis for the design of power transistors", Proceedings of ICEE 95, May 15-18 1995.
- [7] A.Fotowat, "RF transmission, and micropower filtering integrated circuits for implantable ultrasonic blood flow telemetry", Stanford University, SEL technical report No. G558-20, June 1991.
- [6] A.Wong, A.Fotowat, "Circuits for Wide-band FM demodulation", RF Design, pp. 27-34, Dec 1990.
- [5] A.Fotowat, et.al., "System and hardware design considerations for Mobile phone-sets", International Conference of The Society for Automotive Engineering, Detroit, Michigan, Pub. 900248, pp. 1-14, March 1990.
- [4] A.Fotowat, S.Navid, L.Engh, "Audio processing for cellular radio or high performance transceivers", Proceedings of the RF Technology Expo, pp. 195-203, Feb 1989.

- [3] A.Fotowat, E.Murthi, "Gilbert-type vs. Diode Mixers, Proceedings of the RF Technology Expo.", pp. 409-413, Feb 1989.
- [2] Contributor to the following book: W.I. Gay, J.E. Heavner (Editors), "Methods of animal experimentation", Vol 7, Part A, Academic press, 1986. (Sections on Outward telemetry links, pp. 88-90, and Blood flow measurement pp.74-76).
- [1] A.Fotowat, et. al, "RF attenuation of an implantable transmitter signal", IEEE Engineering in Medicine and Biology, 6th Conference, CH2058-6: pp. 738-741, Sep 1984.

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