

## Books

- [1] B. Murmann and B. E. Boser, *Digitally assisted pipeline ADCs-theory and implementation*. Boston: Kluwer Academic Publishers, 2004. [Online]. Available: <http://www.springer.com/us/book/9781402078392>.

## Book Chapters

- [1] C. D. Ezekwe and B. E. Boser, “Low-power vibratory gyroscope readout,” in *Smart sensor systems: Emerging technologies and applications*, G. Meijer, K. Makinwa, and M. Pertijs, Eds., Wiley, Jun. 2014, pp. 101–143. [Online]. Available: <http://onlinelibrary.wiley.com/doi/10.1002/9781118701508.ch5/summary>.
- [2] S. Gambini, K. Skucha, J. Kim, and B. E. Boser, “Microfluidics and nanotechnology,” in E. Lagally, Ed. CRC Press, 2014, ch. 5 Technologies for Low-Cost, Hall Effect–Based Magnetic Immunosensors, pp. 131–152. [Online]. Available: <https://www.crcpress.com/Microfluidics-and-Nanotechnology-Biosensing-to-the-Single-Molecule-Limit/Lagally/9781466594906>.
- [3] T. Ishikawa, T. Aytur, and B. Boser, “A wireless integrated immunosensor,” in *Complex medical engineering*, J. L. Wu, K. Ito, S. Tobimatsu, T. Nishida, and H. Fukuyama, Eds., Springer, 2007, pp. 555–563.
- [4] B. Boser, “Autonomous wireless sensors,” in *Aacd*, R. J. van de Plassche, J. H. Huijsing, and W. M. C. Sansen, Eds., vol. Analog circuit design: Sensor and actuator interface electronics, integrated high-voltage electronics, power management, Montreux, Switzerland: Springer, Hamburg, 2004.
- [5] V. P. Petkov and B. E. Boser, “Capacitive interfaces for MEMS,” in *Enabling technology for MEMS and nanodevices*, Baltes, Brand, Fedder, Hierold, Korvink, and Tabata, Eds., Wiley-VCH, 2004, pp. 49–92.
- [6] B. E. Boser, “Capacitive evaluation circuits,” in *Sensors for automotive technology*, J. Marek, H.-P. Trah, Y. Suzuki, and I. Yokomor, Eds., Wiley-VCH, 2003, pp. 237–255.

## Journal Articles

- [1] B. Behroozpour, P. A. M. Sandborn, N. Quack, T. J. Seok, Y. Matsui, M. C. Wu, and B. E. Boser, “Electronic-photonic integrated circuit for 3d microimaging,” *Ieee journal of solid-state circuits*, vol. 52, no. 1, pp. 161–172, Jan. 2017, ISSN: 0018-9200. DOI: 10.1109/JSSC.2016.2621755.
- [2] P. Murali, A. M. Niknejad, and B. E. Boser, “Cmos microflow cytometer for magnetic label detection and classification,” *Ieee journal of solid-state circuits*, vol. 52, no. 2, pp. 543–555, Feb. 2017, ISSN: 0018-9200. DOI: 10.1109/JSSC.2016.2621036.

- [3] Y. Lu, H. Y. Tang, S. Fung, B. E. Boser, and D. A. Horsley, "Pulse-echo ultrasound imaging using an aln piezoelectric micromachined ultrasonic transducer array with transmit beam-forming," *Journal of microelectromechanical systems*, vol. 25, no. 1, pp. 179–187, Feb. 2016, ISSN: 1057-7157. DOI: 10.1109/JMEMS.2015.2503336.
- [4] E. Papageorgiou, H. Zhang, B. Boser, C. Park, and M. Anwar, "A 1-mm optics-free real-time intraoperative fluorescent imager for microscopic residual tumor," *International journal of radiation oncology - biology - physics*, vol. 96, no. 2, S111, 2016.
- [5] H. Y. Tang, Y. Lu, X. Jiang, E. J. Ng, J. M. Tsai, D. A. Horsley, and B. E. Boser, "3-d ultrasonic fingerprint sensor-on-a-chip," *Ieee journal of solid-state circuits*, vol. 51, no. 11, pp. 2522–2533, Nov. 2016, ISSN: 0018-9200. DOI: 10.1109/JSSC.2016.2604291.
- [6] Y. Lu, H. Tang, Q. Wang, S. Fung, J. Tsai, M. Daneman, B. Boser, and D. Horsley, "Waveguide piezoelectric micromachined ultrasonic transducer array for short-range pulse-echo imaging," *Applied physics letters*, vol. 106, no. 19, p. 193 506, May 2015. DOI: 10.1063/1.4921346.
- [7] R. Przybyla, H.-Y. Tang, A. Guedes, S. Shelton, D. Horsley, and B. Boser, "3D ultrasonic rangefinder on a chip," *Solid-state circuits, ieee journal of*, vol. 50, no. 1, pp. 320–334, Jan. 2015, ISSN: 0018-9200. DOI: 10.1109/JSSC.2014.2364975.
- [8] H. Y. Tang, D. Seo, U. Singhal, X. Li, M. M. Maharbiz, E. Alon, and B. E. Boser, "Miniaturizing ultrasonic system for portable health care and fitness," *Ieee transactions on biomedical circuits and systems*, vol. 9, no. 6, pp. 767–776, Dec. 2015, ISSN: 1932-4545. DOI: 10.1109/TBCAS.2015.2508439.
- [9] B. Boser, "Bob Meyer: A life in circuits [guest editorial]," *Solid-state circuits magazine, ieee*, vol. 6, no. 1, pp. 7–7, Mar. 2014, ISSN: 1943-0582. DOI: 10.1109/MSSC.2013.2291054.
- [10] T.-H. Su, S. Nitzan, P. Taheri-Tehrani, M. Kline, B. Boser, and D. Horsley, "Silicon MEMS disk resonator gyroscope with an integrated CMOS analog front-end," *Sensors journal, ieee*, vol. 14, no. 10, pp. 3426–3432, Oct. 2014, ISSN: 1530-437X. DOI: 10.1109/JSEN.2014.2335735.
- [11] K. Skucha, S. Gambini, P. Liu, M. Megens, J. Kim, and B. E. Boser, "Design considerations for cmos-integrated hall-effect magnetic bead detectors for biosensor applications," *Journal of microelectromechanical systems*, vol. 22, no. 6, pp. 1327–1338, Dec. 2013. DOI: 10.1109/JMEMS.2013.2259615.
- [12] B. Cagdaser and B. E. Boser, "Low-voltage electrostatic actuation with inherent position feedback," *Microelectromechanical systems, journal of*, vol. 21, no. 5, pp. 1187–1196, 2012. DOI: 10.1109/JMEMS.2012.2196496.
- [13] P. P. Liu, K. Skucha, Y. Duan, M. Megens, K. Jungkyu, I. I. Izyumin, S. Gambini, and B. Boser, "Magnetic relaxation detector for microbead labels," *Ieee journal of solid-state circuits*, vol. 47, no. 4, pp. 1056–1064, Apr. 2012.

- [14] C. Mei Lin, B. Yoxall, P. Hyunkyuu, K. Zhaoyi, I. Izyumin, J. Chou, M. M. Megens, M. C. Wu, B. E. Boser, and D. A. Horsley, "Design and characterization of mems micromotor supported on low friction liquid bearing," *Sensors and actuators: A physical*, vol. 177, Apr. 2012.
- [15] K. Jungkyu, E. C. Jensen, M. Megens, B. Boser, and R. A. Mathies, "Integrated microfluidic bioprocessor for solid phase capture immunoassays," *Lab on a chip*, vol. 11, no. 18, pp. 3106–3112, 2011. DOI: 10.1039/C1LC20407F.
- [16] P. Liu, K. Skucha, M. Megens, and B. Boser, "A CMOS hall-effect sensor for the characterization and detection of magnetic nanoparticles for biomedical applications," *Ieee transactions on magnetics*, vol. 47, no. 10, pp. 3449–3451, Oct. 2011.
- [17] R. J. Przybyla, S. E. Shelton, A. Guedes, I. I. Izyumin, M. H. Kline, D. A. Horsley, and B. E. Boser, "In-air rangefinding with an AlN piezoelectric micromachined ultrasound transducer," *Ieee sensors journal*, vol. 11, no. 11, pp. 2690–2697, Nov. 2011. DOI: 10.1109/JSEN.2011.2157490.
- [18] O. Florescu, K. Wang, P. Au, J. Tang, E. Harris, P. R. Beatty, and B. E. Boser, "On-chip magnetic separation of superparamagnetic beads for integrated molecular analysis," *Journal of applied physics*, vol. 107, no. 5, Mar. 2010.
- [19] K. Skucha, Z. Y. Fan, K. Jeon, A. Javey, and B. Boser, "Palladium/silicon nanowire schottky barrier-based hydrogen sensors," *Sensors and actuators b-chemical*, vol. 145, no. 1, pp. 232–238, Mar. 2010. DOI: 10.1016/j.snb.2009.11.067.
- [20] C. D. Ezekwe and B. E. Boser, "A mode-matching sigma delta closed-loop vibratory gyroscope readout interface with a 0.004 degrees/s/root-Hz noise floor over a 50 Hz band," *Ieee journal of solid-state circuits*, vol. 43, no. 12, pp. 3039–3048, Dec. 2008. DOI: 10.1109/JSSC.2008.2006465.
- [21] O. Florescu, M. Mattmann, and B. Boser, "Fully integrated detection of single magnetic beads in complementary metal-oxide-semiconductor," *Journal of applied physics*, vol. 103, no. 4, Feb. 2008.
- [22] B. Murmann and B. E. Boser, "Digital domain measurement and cancellation of residue amplifier nonlinearity in pipelined ADCs," *Ieee transactions on instrumentation and measurement*, vol. 56, no. 6, pp. 2504–2514, Dec. 2007.
- [23] T. Aytur, J. Foley, M. Anwar, B. Boser, E. Harris, and P. R. Beatty, "A novel magnetic bead bioassay platform using a microchip-based sensor for infectious disease diagnosis," *J immunol methods*, vol. 314, no. 1-2, pp. 21–29, Jul. 2006.
- [24] V. P. Petkov and B. E. Boser, "High-order electromechanical sigma delta modulation in micromachined inertial sensors," *Ieee transactions on circuits and systems i-regular papers*, vol. 53, no. 5, pp. 1016–1022, May 2006.
- [25] B. S. Leibowitz, B. E. Boser, and K. S. J. Pister, "A 256-element CMOS imaging receiver for free-space optical communication," *Ieee journal of solid-state circuits*, vol. 40, no. 9, pp. 1948–1956, Sep. 2005.

- [26] V. P. Petkov and B. E. Boser, "A fourth-order sigma delta interface for micromachined inertial sensors," *Ieee journal of solid-state circuits*, vol. 40, no. 8, pp. 1602–1609, Aug. 2005.
- [27] B. Murmann and B. E. Boser, "Digitally assisted analog integrated circuits," *Acm queue*, vol. 1 (invited), pp. 64–71, Mar. 2004.
- [28] ———, "A 12-bit 75-MS/s pipelined ADC using open-loop residue amplification," *Ieee journal of solid-state circuits*, vol. 38, no. 12, pp. 2040–2050, Dec. 2003. DOI: 10.1109/JSSC.2003.819167.
- [29] M. D. Scott, B. E. Boser, and K. S. J. Pister, "An ultralow-energy ADC for smart dust," *Ieee journal of solid-state circuits*, vol. 38, no. 7, pp. 1123–1129, Jul. 2003.
- [30] J. I. Seeger and B. E. Boser, "Charge control of parallel-plate, electrostatic actuators and the tip-in instability," *Journal of microelectromechanical systems*, vol. 12, no. 5, pp. 656–671, Oct. 2003. DOI: 10.1109/JMEMS.2003.818455.
- [31] L. Doherty, B. A. Warneke, B. E. Boser, and K. S. J. Pister, "Energy and performance considerations for smart dust," *International journal of parallel and distributed systems & networks*, vol. 4, no. 3, pp. 121–33, 2001.
- [32] D. J. Young, B. E. Boser, V. Malba, and A. F. Bernhardt, "A micromachined RF low phase noise voltage-controlled oscillator for wireless communications," *International journal of RF and microwave computer-aided engineering*, vol. 11, no. 5, pp. 285–300, Sep. 2001. DOI: 10.1002/mmce.1037.
- [33] J. Yang, J. Vykoulal, J. Noshari, F. Becker, P. Gascoyne, P. Krulevitch, C. Fuller, H. Ackler, J. Hamilton, B. Boser, A. Eldredge, D. Hichens, and C. Andrews, "Dielectrophoresis-based microfluidic separation and detection systems," *International journal of advanced manufacturing systems*, vol. 3, no. 2, pp. 1–12, 2000.
- [34] K. Iwata, B. H. Hasegawa, J. A. Heanue, P. R. Bennett, K. S. Shah, C. D. Boles, and B. E. Boser, "CdZnTe detector for combined x-ray CT and SPECT," *Nuclear instruments & methods in physics research section a-accelerators spectrometers detectors and associated equipment*, vol. 422, no. 1-3, pp. 740–744, Feb. 1999.
- [35] M. Lemkin and B. E. Boser, "A three-axis micromachined accelerometer with a CMOS position-sense interface and digital offset-trim electronics," *Ieee journal of solid-state circuits*, vol. 34, no. 4, pp. 456–468, Apr. 1999.
- [36] J. J. Allen, R. D. Kinney, J. Sarsfield, M. R. Daily, J. R. Ellis, J. H. Smith, S. Montague, R. T. Howe, B. E. Boser, R. Horowitz, A. P. Pisano, M. A. Lemkin, W. A. Clark, and T. Juneau, "Integrated micro-electro-mechanical sensor development for inertial applications," *Ieee aerospace and electronic systems magazine*, vol. 13, no. 11, pp. 36–40, Nov. 1998.
- [37] C. D. Boles, B. E. Boser, B. H. Hasegawa, and J. A. Heanue, "A multimode digital detector readout for solid-state medical imaging detectors," *Ieee journal of solid-state circuits*, vol. 33, no. 5, pp. 733–742, May 1998.

- [38] A. R. Feldman, B. E. Boser, and P. R. Gray, "A 13-bit, 1.4 -ms/s sigma-delta modulator for rf baseband channel applications," *Ieee journal of solid-state circuits*, vol. 33, no. 10, pp. 1462–1469, Oct. 1998.
- [39] D. J. Allstot, B. E. Boser, and J. F. Ewen, "Introduction to the special issue on analog, sensor, and communications circuits of the 1996 isscc," *Ieee journal of solid-state circuits*, vol. 31, no. 12, pp. 1843–1845, Dec. 1996.
- [40] B. E. Boser and R. T. Howe, "Surface micromachined accelerometers," *Ieee journal of solid-state circuits*, vol. 31, no. 3, pp. 366–375, Mar. 1996.
- [41] R. T. Howe, B. E. Boser, and A. P. Pisano, "Polysilicon integrated microsystems: Technologies and applications," *Sensors and actuators a-physical*, vol. 56, no. 1-2, pp. 167–177, Aug. 1996.
- [42] J. A. Heanue and B. E. Boser, "CMOS detector readout electronics for an emission-transmission medical imaging-system," *Ieee transactions on nuclear science*, vol. 42, no. 4, pp. 1133–1138, Aug. 1995.
- [43] C. Lu, M. Lemkin, and B. E. Boser, "A monolithic surface micromachined accelerometer with digital output," *Ieee journal of solid-state circuits*, vol. 30, no. 12, pp. 1367–1373, Dec. 1995.
- [44] B. E. Boser, E. Sackinger, J. Bromley, Y. Lecun, and L. D. Jackel, "Hardware requirements for neural network pattern classifiers - a case-study and implementation," *Ieee micro*, vol. 12, no. 1, pp. 32–40, Feb. 1992.
- [45] E. Sackinger, B. E. Boser, J. Bromley, Y. Lecun, and L. D. Jackel, "Application of the anna neural network chip to high-speed character-recognition," *Ieee transactions on neural networks*, vol. 3, no. 3, pp. 498–505, May 1992.
- [46] B. E. Boser, E. Sackinger, J. Bromley, Y. Lecun, and L. D. Jackel, "An analog neural network processor with programmable topology," *Ieee journal of solid-state circuits*, vol. 26, no. 12, pp. 2017–2025, Dec. 1991.
- [47] Y. Le Cun, L. D. Jackel, B. Boser, J. S. Denker, H. P. Graf, I. Guyon, D. Henderson, R. E. Howard, and W. Hubbard, "Handwritten digit recognition: Applications of neural network chips and automatic learning," *Ieee communications magazine*, vol. 27, no. 11, pp. 41–6, 1989.
- [48] Y. LeCun, B. Boser, J. S. Denker, D. Henderson, R. E. Howard, W. Hubbard, and L. D. Jackel, "Backpropagation applied to handwritten zip code recognition," *Neural computation*, vol. 1, no. 4, pp. 541–51, 1989.
- [49] Y. LeCun, L. D. Jackel, B. Boser, J. S. Denker, H. P. Graf, I. Guyon, D. Henderson, R. E. Howard, and W. Hubbard, "Handwritten digit recognition - applications of neural network chips and automatic learning," *Ieee communications magazine*, vol. 27, no. 11, pp. 41–46, Nov. 1989.

- [50] B. E. Boser, K. P. Karmann, H. Martin, and B. A. Wooley, “Simulating and testing over-sampled analog-to-digital converters,” *Ieee transactions on computer-aided design of integrated circuits and systems*, vol. 7, no. 6, pp. 668–674, Jun. 1988. DOI: 10.1109/43.3206.
- [51] B. E. Boser and B. A. Wooley, “The design of sigma-delta modulation analog-to-digital converters,” *Ieee journal of solid-state circuits*, vol. 23, no. 6, pp. 1298–1308, Dec. 1988. DOI: 10.1109/4.90025.

## Conference Papers

- [1] X. Jiang, H. Y. Tang, Y. Lu, E. J. Ng, J. M. Tsai, M. J. Daneman, B. E. Boser, and D. A. Horsley, “Inter-element coupling effects in pulse-echo ultrasonic fingerprint sensors,” in *2017 ieee 30th international conference on micro electro mechanical systems (mems)*, Jan. 2017, pp. 1192–1195. DOI: 10.1109/MEMSYS.2017.7863629.
- [2] B. Behroozpour, P. A. M. Sandborn, N. Quack, T. J. Seok, Y. Matsui, M. C. Wu, and B. E. Boser, “11.8 chip-scale electro-optical 3d fmcw lidar with 8  $\mu\text{m}$  ranging precision,” in *2016 ieee international solid-state circuits conference (isscc)*, Jan. 2016, pp. 214–216. DOI: 10.1109/ISSCC.2016.7417983.
- [3] B. Eminoglu, Y. C. Yeh, I. I. Izyumin, I. Nacita, M. Wireman, A. Reinelt, and B. E. Boser, “Comparison of long-term stability of am versus fm gyroscopes,” in *2016 ieee 29th international conference on micro electro mechanical systems (mems)*, Jan. 2016, pp. 954–957. DOI: 10.1109/MEMSYS.2016.7421790.
- [4] D. A. Horsley, Y. Lu, H. Y. Tang, X. Jiang, B. E. Boser, J. M. Tsai, E. J. Ng, and M. J. Daneman, “Ultrasonic fingerprint sensor based on a pmut array bonded to cmos circuitry,” in *2016 ieee international ultrasonics symposium (ius)*, Sep. 2016, pp. 1–4. DOI: 10.1109/ULTSYM.2016.7728817.
- [5] D. A. Horsley, R. J. Przybyla, M. H. Kline, S. E. Shelton, A. Guedes, O. Izyumin, and B. E. Boser, “Piezoelectric micromachined ultrasonic transducers in consumer electronics: The next little thing?” In *2016 ieee 29th international conference on micro electro mechanical systems (mems)*, Jan. 2016, pp. 145–148. DOI: 10.1109/MEMSYS.2016.7421579.
- [6] X. Jiang, H. Y. Tang, Y. Lu, X. Li, J. M. Tsai, E. J. Ng, M. J. Daneman, M. Lim, F. As-saderaghi, B. E. Boser, and D. A. Horsley, “Monolithic 591x438 dpi ultrasonic fingerprint sensor,” in *2016 ieee 29th international conference on micro electro mechanical systems (mems)*, Jan. 2016, pp. 107–110. DOI: 10.1109/MEMSYS.2016.7421569.
- [7] E. P. Papageorgiou, B. E. Boser, and M. Anwar, “An angle-selective cmos imager with on-chip micro-collimators for blur reduction in near-field cell imaging,” in *2016 ieee 29th international conference on micro electro mechanical systems (mems)*, Jan. 2016, pp. 337–340. DOI: 10.1109/MEMSYS.2016.7421629.

- [8] P. Taheri-Tehrani, A. D. Challoner, O. Izyumin, B. Boser, and D. Horsley, “A new electronic feedback compensation method for rate integrating gyroscopes,” in *2016 IEEE International Symposium on Inertial Sensors and Systems*, Feb. 2016, pp. 9–12. DOI: 10.1109/ISSISS.2016.7435532.
- [9] P. Taheri-Tehrani, M. Kline, I. Izyumin, B. Eminoglu, Y. C. Yeh, Y. Yang, Y. Chen, I. Flader, E. J. Ng, T. W. Kenny, B. E. Boser, and D. A. Horsley, “Epitaxially-encapsulated quad mass gyroscope with nonlinearity compensation,” in *2016 IEEE 29th International Conference on Micro Electro Mechanical Systems (MEMS)*, Jan. 2016, pp. 966–969. DOI: 10.1109/MEMSYS.2016.7421793.
- [10] H. Y. Tang, Y. Lu, F. Assaderagh, M. Daneman, X. Jiang, M. Lim, X. Li, E. Ng, U. Singhal, J. M. Tsai, D. A. Horsley, and B. E. Boser, “11.2 3d ultrasonic fingerprint sensor-on-a-chip,” in *2016 IEEE International Solid-State Circuits Conference (ISSCC)*, Jan. 2016, pp. 202–203. DOI: 10.1109/ISSCC.2016.7417977.
- [11] S. Fung, Y. Lu, H. Y. Tang, J. M. Tsai, M. Daneman, B. E. Boser, and D. A. Horsley, “Theory and experimental analysis of scratch resistant coating for ultrasonic fingerprint sensors,” in *2015 IEEE International Ultrasonics Symposium (IUS)*, Oct. 2015, pp. 1–4. DOI: 10.1109/ULTSYM.2015.0150.
- [12] D. A. Horsley, O. Rozen, Y. Lu, S. Shelton, A. Guedes, R. Przybyla, H. Y. Tang, and B. E. Boser, “Piezoelectric micromachined ultrasonic transducers for human-machine interfaces and biometric sensing,” in *2015 IEEE Sensors*, Nov. 2015, pp. 1–4. DOI: 10.1109/ICSENS.2015.7370564.
- [13] V. Iyer, P. Murali, J. Paredes, D. Liepmann, and B. Boser, “Encapsulation of integrated circuits in plastic microfluidic systems using hot embossing,” in *2015 Transducers - 2015 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers)*, Jun. 2015, pp. 1822–1825. DOI: 10.1109/TRANSDUCERS.2015.7181302.
- [14] I. Izyumin, M. Kline, Y.-C. Yeh, B. Eminoglu, C. H. Ahn, V. Hong, Y. Yang, E. Ng, T. Kenny, and B. Boser, “A 7 ppm, 6 deg/hr frequency-output MEMS gyroscope,” in *Micro Electro Mechanical Systems (MEMS), 2015 28th IEEE International Conference on*, Jan. 2015, pp. 33–36. DOI: 10.1109/MEMSYS.2015.7050879.
- [15] Y. Lu, O. Rozen, H. Y. Tang, G. L. Smith, S. Fung, B. E. Boser, R. G. Polcawich, and D. A. Horsley, “Broadband piezoelectric micromachined ultrasonic transducers based on dual resonance modes,” in *2015 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Jan. 2015, pp. 146–149. DOI: 10.1109/MEMSYS.2015.7050907.
- [16] Y. Lu, H. Y. Tang, S. Fung, B. E. Boser, and D. A. Horsley, “Short-range and high-resolution ultrasound imaging using an 8 mhz aluminum nitride pmut array,” in *2015 28th IEEE International Conference on Micro Electro Mechanical Systems (MEMS)*, Jan. 2015, pp. 140–143. DOI: 10.1109/MEMSYS.2015.7050905.

- [17] D. Seo, H. Y. Tang, J. M. Carmena, J. M. Rabaey, E. Alon, B. E. Boser, and M. M. Maharbiz, "Ultrasonic beamforming system for interrogating multiple implantable sensors," in *2015 37th annual international conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, Aug. 2015, pp. 2673–2676. DOI: 10.1109/EMBC.2015.7318942.
- [18] P. Taheri-Tehrani, O. Izyumin, I. Izyumin, C. Ahn, E. Ng, V. Hong, Y. Yang, T. ThKenny, B. Boser, and D. Horsley, "Disk resonator gyroscope with whole-angle mode operation," in *Inertial sensors and systems (ISISS), 2015 IEEE International Symposium on*, Mar. 2015, pp. 1–4. DOI: 10.1109/ISISS.2015.7102360.
- [19] H. Y. Tang, Y. Lu, S. Fung, D. A. Horsley, and B. E. Boser, "11.8 integrated ultrasonic system for measuring body-fat composition," in *2015 IEEE International Solid-State Circuits Conference - (ISSCC) Digest of Technical Papers*, Feb. 2015, pp. 1–3. DOI: 10.1109/ISSCC.2015.7063000.
- [20] H. Y. Tang, D. Seo, M. M. Maharbiz, and B. E. Boser, "Miniature ultrasonic imager for personal fitness tracking," in *2015 IEEE International Ultrasonics Symposium (IUS)*, Oct. 2015, pp. 1–4. DOI: 10.1109/ULTSYM.2015.0148.
- [21] H. Tang, Y. Lu, S. Fung, J. M. Tsai, M. Daneman, D. A. Horsley, and B. E. Boser, "Pulse-echo ultrasonic fingerprint sensor on a chip," in *2015 Transducers - 2015 18th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers)*, Jun. 2015, pp. 674–677. DOI: 10.1109/TRANSDUCERS.2015.7181013.
- [22] H.-Y. Tang, Y. Lu, S. Fung, D. Horsley, and B. Boser, "Integrated ultrasonic system for measuring body-fat composition," in *Solid-State Circuits Conference - (ISSCC), 2015 IEEE International*, Feb. 2015, pp. 1–3. DOI: 10.1109/ISSCC.2015.7063000.
- [23] J. Tsai, M. Daneman, B. Boser, D. Horsley, M. Rais-Zadeh, H. Tang, Y. Lu, O. Rozen, F. Liu, M. Lim, and F. Assaderaghi, "Versatile CMOS-MEMS integrated piezoelectric platform," in *Solid-State Sensors, Actuators and Microsystems (Transducers), 2015 Transducers - 2015 18th International Conference on*, Jun. 2015, pp. 2248–2251. DOI: 10.1109/TRANSDUCERS.2015.7181409.
- [24] B. Behroozpour, N. Quack, P. Sandborn, S. Gerke, W. Yang, C. Chang-Hasnain, M. Wu, and B. Boser, "Method for increasing the operating distance of MEMS LIDAR beyond brownian noise limitation," in *Lasers and Electro-Optics (CLEO), 2014 Conference on*, Jun. 2014. [Online]. Available: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6988384>.
- [25] B. Boser and P. Murali, "Flow cytometer-on-a-chip," in *Biomedical Circuits and Systems Conference (BioCAS), 2014 IEEE*, Oct. 2014, pp. 480–483. DOI: 10.1109/BioCAS.2014.6981767.
- [26] B. Eminoglu, M. Kline, I. Izyumin, Y.-C. Yeh, and B. Boser, "Background calibrated MEMS gyroscope," in *Sensors, 2014 IEEE*, Nov. 2014, pp. 922–925. DOI: 10.1109/ICSENS.2014.6985152.



- [27] ———, “Ratio-metric readout technique for MEMS gyroscopes with force feedback,” in *Position, location and navigation symposium - plans 2014, 2014 ieee/ion*, May 2014, pp. 1203–1208. DOI: 10.1109/PLANS.2014.6851493.
- [28] I. Izyumin, M. Kline, Y.-C. Yeh, B. Eminoglu, and B. Boser, “A 50 micro-W, 2.1 mdeg/s/rt-Hz frequency-to-digital converter for frequency-output MEMS gyroscopes,” in *European solid state circuits conference (esscirc)*, Sep. 2014, pp. 399–402. DOI: 10.1109/ESSCIRC.2014.6942106.
- [29] P. Murali, I. Izyumin, D. Cohen, J.-C. Chien, A. Niknejad, and B. Boser, “A CMOS micro-flow cytometer for magnetic label detection and classification,” in *Solid-state circuits conference digest of technical papers (isscc), 2014 ieee international*, Feb. 2014, pp. 422–423. DOI: 10.1109/ISSCC.2014.6757497.
- [30] P. Murali, I. Izyumin, S. Prabhu, D. Cohen, and B. Boser, “A magnetic flow cytometer with integrated microfluidics,” in *Technical digest solid-state sensor and actuator workshop*, Transducers foundation, Hilton Head Island, Georgia, 2014, pp. 159–162.
- [31] R. Przybyla, H.-Y. Tang, S. Shelton, D. Horsley, and B. Boser, “3d ultrasonic gesture recognition,” in *Solid-state circuits conference digest of technical papers (isscc), 2014 ieee international*, Feb. 2014, pp. 210–211. DOI: 10.1109/ISSCC.2014.6757403.
- [32] S. Shelton, O. Rozen, A. Guedes, R. Przybyla, B. Boser, and D. Horsley, “Improved acoustic coupling of air-coupled micromachined ultrasonic transducers,” in *Micro electro mechanical systems (mems), 2014 ieee 27th international conference on*, Jan. 2014, pp. 753–756. DOI: 10.1109/MEMSYS.2014.6765750.
- [33] M. H. Kline, Y. C. Yeh, B. Eminoglu, I. I. Izyumin, M. Daneman, D. A. Horsley, and B. E. Boser, “MEMS gyroscope bias drift cancellation using continuous-time mode reversal,” in *Transducers & eurosensors xxvii: 17th international conference on solid-state sensors, actuators and microsystems*, Jun. 2013, pp. 1855–58.
- [34] M. H. Kline, Y. Yeh, B. Eminoglu, H. Najjar, M. Daneman, D. A. Horsley, and B. E. Boser, “Quadrature FM gyroscope,” in *2013 ieee 26th international conference on micro electro mechanical systems (mems)*, Jan. 2013, pp. 604–608.
- [35] S. Nitzan, C. H. Ahn, T. H. Su, M. Li, E. J. Ng, S. Wang, Z. M. Yang, G. O’Brien, B. E. Boser, T. W. Kenny, and D. A. Horsley, “Epitaxially-encapsulated polysilicon disk resonator gyroscope,” 2013, pp. 625–628.
- [36] T. H. Su, S. Nitzan, P. Taheri-Tehrani, M. Kline, B. Boser, and D. A. Horsley, “MEMS disk resonator gyroscope with integrated analog front-end,” 2013.
- [37] B. E. Boser, “A first course in electronics,” in *Circuits and systems (iscas), 2012 ieee international symposium on*, 2012, pp. 2929–2932.
- [38] S. Gambini, K. Skucha, P. Liu, K. Jungkyu, R. Krigel, R. Mathies, and B. Boser, “A CMOS 10kpixel baseline-free magnetic bead detector with column-parallel readout for miniaturized immunoassays,” in *Solid-state circuits conference digest of technical papers (isscc), 2012 ieee international*, 2012, pp. 126–128. DOI: 10.1109/ISSCC.2012.6176948.

- [39] F. T. Goericke, G. Vigevani, I. I. Izyumin, B. E. Boser, and A. P. Pisano, “Novel thin-film piezoelectric aluminum nitride rate gyroscope,” Aug. 2012, pp. 1067–1070.
- [40] M. Kline, I. Izyumin, B. Boser, and S. Sanders, “A transformerless galvanically isolated switched capacitor led driver,” in *Applied power electronics conference and exposition (apex), 2012 twenty-seventh annual ieee*, 2012, pp. 2357–2360.
- [41] G. Vigevani, F. T. Goericke, A. P. Pisano, I. I. Izyumin, and B. E. Boser, “Microleverage detf aluminum nitride resonating accelerometer,” in *Frequency control symposium (fcs), 2012 ieee international*, 2012, pp. 1–4.
- [42] F. T. Goericke, M. W. Chan, G. Vigevani, I. Izyumin, B. E. Boser, and A. P. Pisano, “High temperature compatible aluminum nitride resonating strain sensor,” in *Transducers 2011 - 2011 16th international solid-state sensors, actuators and microsystems conference*, 2011, pp. 1994–1997.
- [43] A. Guedes, S. Shelton, R. Przybyla, I. Izyumin, B. Boser, and D. A. Horsley, “Aluminum nitride pmut based on a flexurally-suspended membrane,” in *Transducers 2011 - 2011 16th international solid-state sensors, actuators and microsystems conference*, 2011, pp. 2062–2065. DOI: 10.1109/TRANSDUCERS.2011.5969223.
- [44] M. Kline, I. Izyumin, B. Boser, and S. Sanders, “Capacitive power transfer for contactless charging,” in *Twenty-sixth annual ieee applied power electronics conference and exposition - apex 2011*, 2011, pp. 1398–1404.
- [45] P. Liu, K. Skucha, Y. Duan, M. Megens, K. Jungkyu, I. Izyumin, S. Gambini, and B. Boser, “Magnetic relaxation detector for microbead labels in biomedical assays,” in *2011 symposium on vlsi circuits. digest of technical papers*, 2011, pp. 176–177.
- [46] C. Mei-Lin, B. Yoxall, P. Hyunkyuu, K. Zhaoyi, I. Izyumin, J. Chou, M. M. Megens, M. C. Wu, B. E. Boser, and D. A. Horsley, “Low friction liquid bearing mems micromotor,” in *Micro electro mechanical systems (mems), 2011 ieee 24th international conference on*, 2011, pp. 1237–1240.
- [47] R. Przybyla, A. Flynn, V. Jain, S. Shelton, A. Guedes, I. Izyumin, D. Horsley, and B. Boser, “A micromechanical ultrasonic distance sensor with >1 meter range,” in *Solid-state sensors, actuators and microsystems conference (transducers), 2011 16th international*, 2011, pp. 2070–2073. DOI: 10.1109/TRANSDUCERS.2011.5969226.
- [48] K. Skucha, P. Liu, M. Megens, J. Kim, and B. Boser, “A compact hall-effect sensor array for the detection and imaging of single magnetic beads in biomedical assays,” in *Transducers 2011 - 2011 16th international solid-state sensors, actuators and microsystems conference*, 2011, pp. 1833–1836.
- [49] G. Vigevani, F. T. Goericke, I. I. Izyumin, B. E. Boser, and A. P. Pisano, “Electrode design and coupling optimization of aluminum nitride detf,” in *Ultrasonics symposium (ius), 2011 ieee international*, 2011, pp. 1731–1734.

- [50] R. Przybyla, I. Izyumin, M. Kline, B. Boser, and S. Shelton, “An ultrasonic rangefinder based on an aln piezoelectric micromachined ultrasound transducer,” in *2010 ninth ieee sensors conference (sensors 2010)*, 2010, pp. 2417–2421. DOI: 10.1109/ICSENS.2010.5690777.
- [51] G. Vigevani, R. J. Przybyla, Y. Ting-Ta, L. Chih-Ming, A. Guedes, J. H. Kuypers, B. E. Boser, D. A. Horsley, and A. P. Pisano, “Characterization of a single port aluminum nitride tuning fork,” in *2010 international ultrasonics symposium*, 2010, pp. 1281–1285. DOI: 10.1109/ULTSYM.2010.5935543.
- [52] A. Wu, L. Wang, E. Jensen, R. Mathies, and B. Boser, “Modular integration of electronics and microfluidic systems using flexible printed circuit boards,” in *Lab on a chip*, vol. 10, 2010, pp. 519–521.
- [53] S. Shelton, C. Mei-Lin, P. Hyunkyu, D. Horsley, B. Boser, I. Izyumin, R. Przybyla, T. Frey, M. Judy, K. Nunan, F. Sammoura, and Y. Ken, “CMOS-compatible AlN piezoelectric micromachined ultrasonic transducers,” in *2009 ieee international ultrasonics symposium*, 2009, pp. 402–405. DOI: 10.1109/ULTSYM.2009.5441602.
- [54] C. D. Ezekwe and B. E. Boser, “A mode-matching delta-sigma closed-loop vibratory-gyroscope readout interface with a 0.004degrees/s(hz) noise floor over a 50 hz band,” in *2008 ieee international solid-state circuits conference. san francisco, ca, 2008*.
- [55] —, “Automatic mode matching for high-q vibratory gyroscopes,” in *Technical digest solid-state sensor and actuator workshop*, Hilton Head Island, Georgia, 2008.
- [56] —, “Robust compensation of a force-balanced high-Q gyroscope,” in *2008 ieee sensors. lecce, italy.*, Oct. 2008, pp. 26–29. [Online]. Available: [http://ieeexplore.ieee.org/xpls/abs\\_all.jsp?arnumber=4716561](http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=4716561).
- [57] B. E. Boser, “From micro to nano: MEMS as an interface to the nano world,” in *Ieee/acm international conference on computer-aided design*, San Jose: IEEE, 2006, pp. 824–825.
- [58] M. Anwar, T. Aytur, J. Foley, P. Beatty, and B. E. Boser, “Integrated circuit and micro-fabrication compatible materials for protein binding,” in *Micro total analysis systems*, Boston, MA, 2005.
- [59] B. Cagdaser and B. E. Boser, “Resonant drive for stabilizing parallel-plate actuators beyond the pull-in point,” in *Transducers '05. the 13th international conference on solid-state sensors, actuators and microsystems. digest of technical papers. seoul, south korea. korean sensors soc. 5-9 june 2005*, 2005. DOI: 10.1109/SENSOR.2005.1496510.
- [60] —, “Resonant drive: Sense and high voltage electrostatic drive using single MEMS capacitor and low voltage electronics,” in *18th ieee international conference on micro electro mechanical systems. miami beach, fl, 2005*. DOI: 10.1109/MEMSYS.2005.1453887.
- [61] K. E. Wojciechowski, B. E. Boser, and A. P. Pisano, “A MEMS resonant strain sensor with 33 nano-strain resolution in a 10 khz bandwidth,” in *2005 ieee sensors. irvine, ca, 2005*.

- [62] T. S. Aytur, T. Ishikawa, and B. E. Boser, "A 2.2-mm<sup>2</sup> CMOS bioassay chip and wireless interface," in *2004 symposium on vlsi circuits. digest of technical papers. honolulu, hi*, 2004.
- [63] B. Cagdaser, A. Jog, M. Last, B. S. Leibowitz, L. Zhou, E. Shelton, K. S. J. Pister, and B. E. Boser, "Capacitive sense feedback control for MEMS beam steering mirrors," in *Technical digest. solid-state sensor and actuator workshop. hilton head island, sc*, 2004.
- [64] B. S. Leibowitz, B. E. Boser, and K. S. J. Pister, "A 256-element CMOS imaging receiver for free-space optical communication," in *Proceedings of the ieee 2004 custom integrated circuits conference . orlando, fl*, 2004.
- [65] V. P. Petkov and B. E. Boser, "A fourth-order sigma-delta interface for micromachined inertial sensors," in *2004 ieee international solid-state circuits conference. san francisco, ca*, 2004.
- [66] K. E. Wojciechowski, B. E. Boser, and A. P. Pisano, "A MEMS resonant strain sensor operated in air," in *17th ieee international conference on micro electro mechanical systems. maastricht mems 2004 technical digest. maastricht, netherlands. ieee. robotics and automation soc. 25-29 jan. 2004*, 2004.
- [67] S. A. Bhave, J. I. Seeger, J. Xuesong, B. E. Boser, R. T. Howe, and J. Yasaitis, "An integrated, vertical-drive, in-plane-sense microgyroscope," in *Ieee international solid-state sensors and actuators conference. boston, ma*, 2003.
- [68] M. Last, B. S. Leibowitz, B. Cagdaser, A. Jog, L. Zhou, B. Boser, and K. S. J. Pister, "Toward a wireless optical communication link between two small unmanned aerial vehicles," in *Iscas 2003. international symposium on circuits and systems. bangkok, thailand. ieee circuits & syst. soc. mahanakorn univ. technol. 25-28 may 2003*, 2003. DOI: 10.1109/ISCAS.2003.1205173.
- [69] B. Murmann and B. E. Boser, "A 12-b 75-MS/s pipelined ADC using open-loop residue amplification," in *Proceedings of ieee international solid-state circuits conference. san francisco, ca*, vol. 1, 2003, pp. 328–9. DOI: 10.1109/ISSCC.2003.1234320.
- [70] M. D. Scott, B. E. Boser, and K. S. J. Pister, "An ultralow-energy ADC for smart dust," in *Esscirc 2002. proceedings of the 28th european solid-state circuit conference. firenze, italy. 24-26 sept. 2002*, 2003.
- [71] J. I. Seeger and B. E. Boser, "Negative capacitance for control of gap-closing electrostatic actuators," in *Ieee international solid-state sensors and actuators conference. boston, ma*, 2003.
- [72] J. Yasaitis, M. Judy, T. Brosnihan, P. Garone, N. Pokrovskiy, D. Sniderman, S. Limb, R. Howe, B. Boser, M. Palaniapan, J. Xuesong, and S. Bhave, "A modular process for integrating thick polysilicon MEMS devices with sub-micron CMOS," in *Micromachining and microfabrication process technology vii. san jose, ca*, 2003.

- [73] T. Aytur, P. Beatty, B. E. Boser, M. Anwar, and T. Ishikawa, "An immunoassay platform based on CMOS hall sensors," in *Technical digest. solid-state sensor and actuator workshop.*, Hilton Head Island, SC, 2002, pp. 126–129.
- [74] B. Cagdaser, B. S. Leibowitz, M. Last, K. Ramanathan, B. E. Boser, and K. S. J. Pister, "Pointing error correction for MEMS laser communication system," in *Acit 2002, iasted international conference on automatic, control & it. novosibirsk, russia. iasted. siberian branch of the russian acad. sci.. sibnorthtechcomplect. contact co.. et al. 10-13 june 2002*, M. H. Hamza, O. I. Potaturkin, and Y. I. Shokin, Eds., 2002.
- [75] X. Jiang, F. Wang, M. Kraft, and B. Boser, "An integrated surface micromachined capacitive lateral accelerometer with 2 ug/rt-hz resolution," in *The solid-state sensor and actuator workshop*, Hilton Head, SC, 2002, pp. 202–205.
- [76] M. D. Scott, B. E. Boser, and K. S. J. Pister, "An ultra-low power ADC for distributed sensor networks," in *Esscirc 2002. proceedings of the 28th european solid-state circuit conference. firenze, italy. 24-26 sept. 2002*, A. Baschiroto and P. Malcovati, Eds., 2002.
- [77] J. I. Seeger, J. Xuesong, M. Kraft, and B. E. Boser, "Parallel plate driven oscillations and resonant pull-in," in *Technical digest. solid-state sensor and actuator workshop. hilton head island, sc*, 2002, pp. 313–6.
- [78] B. A. Warneke, M. D. Scott, B. S. Leibowitz, Z. Lixia, C. L. Bellew, J. A. Chediak, J. M. Kahn, B. E. Boser, and K. S. J. Pister, "An autonomous 16 mm<sup>3</sup> solar-powered node for distributed wireless sensor networks," in *Proceedings of ieee sensors 2002. orlando, fl*, 2002.
- [79] J. Xuesong, S. A. Bhave, J. I. Seeger, R. T. Howe, B. E. Boser, and J. Yasaitis, "SD capacitive interface for a vertically-driven x&y-axis rate gyroscope," in *Esscirc 2002. proceedings of the 28th european solid-state circuit conference. firenze, italy. 24-26 sept. 2002*, A. Baschiroto and P. Malcovati, Eds., 2002.
- [80] ———, "Sigma-delta capacitive interface for a vertically-driven x&y-axis rate gyroscope," in *Esscirc 2002. proceedings of the 28th european solid-state circuit conference. firenze, italy. 24-26 sept. 2002*, A. Baschiroto and P. Malcovati, Eds., 2002.
- [81] B. S. Leibowitz, B. E. Boser, and K. S. J. Pister, "CMOS "smart pixel" for free-space optical communication," in *Sensors and camera systems for scientific, industrial, and digital photography applications ii. san jose, ca*, 2001.
- [82] C. Fuller, J. Hamilton, H. Ackler, P. Krulevitch, P. Gascoyne, F. Becker, A. Eldredge, J. Yang, and B. Boser, "Microfabricated multi-frequency particle impedance characterization system," in *Proceedings microtas*, Twente, 2000.
- [83] J. I. Seeger, J. Xuesong, M. Kraft, and B. E. Boser, "Sense finger dynamics in a sd force-feedback gyroscope," in *Technical digest. solid-state sensor and actuator workshop. hilton head island, sc*, 2000.

- [84] J. Xuesong, J. I. Seeger, M. Kraft, and B. E. Boser, "A monolithic surface micromachined z-axis gyroscope with digital output," in *2000 symposium on vlsi circuits. digest of technical papers. hawaii, hi*, 2000.
- [85] K. Iwata, B. H. Hasegawa, J. A. Heanue, P. R. Bennett, K. S. Shah, C. D. Boles, and B. E. Boser, "CdZnTe detector for combined x-ray CT and SPECT," in *Ninth symposium on radiation measurements and applications. ann arbor, mi*, 1999.
- [86] J. I. Seeger and B. E. Boser, "Dynamics and control of parallel-plate actuators beyond the electrostatic instability," in *Transducers digest of technical papers*, 1999, pp. 474–7.
- [87] D. J. Young, J. L. Tham, and B. E. Boser, "A micromachine-based low phase-noise ghz voltage-controlled oscillator for wireless communication," in *Transducers '99. the 10th international conference on solid-state sensors, actuators and microsystems. digest of technical papers. june 1999*, 1999, pp. 1386–9.
- [88] J. J. Allen, R. D. Kinney, J. Sarsfield, M. R. Daily, J. R. Ellis, J. H. Smith, S. Montague, R. T. Howe, B. E. Boser, R. Horowitz, A. P. Pisano, M. A. Lemkin, W. A. Clark, and C. T. Juneau, "Integrated micro-electro-mechanical sensor development for inertial applications," in *Ieee 1998 position location and navigation symposium. palm springs, ca*, 1998.
- [89] A. R. Feldman, B. E. Boser, and P. R. Gray, "A 13 bit, 1.4 ms/s, 3.3 v sigma-delta modulator for rf baseband channel applications," in *Proceedings of the ieee 1998 custom integrated circuits conference . santa clara, ca*, 1998.
- [90] K. Iwata, B. H. Hasegawa, J. A. Heanue, P. R. Bennett, K. S. Shah, C. D. Boles, and B. E. Boser, "Improvements in cdznte detection system for combined x-ray ct and spect," in *1998 ieee nuclear science symposium conference record. toronto, ont., canada. 8-14 nov. 1998*, 1998.
- [91] V. Malba, D. Young, J. J. Ou, A. F. Bernhardt, and B. E. Boser, "High-performance rf coil inductors on silicon," in *1998 proceedings. 48th electronic components and technology conference (cat. no.98ch36206). seattle, wa*, 1998.
- [92] N. Wongkomet and B. E. Boser, "Correlated double sampling in capacitive position sensing circuits for micromachined applications," in *Ieee. apccas 1998. 1998 ieee asia-pacific conference on circuits and systems. microelectronics and integrating systems. Chiangmai, thailand. nat. electron. & comput. technol. center. ieee circuits & syst. soc.. ministr. sci., technol., & environ.. ministr. univ. affairs. ieee thailand sect. 24-27 nov. 1998*, 1998.
- [93] N. Wongkomet, D. A. Horsley, and B. E. Boser, "Capacitive position sensing circuit for microactuators for HDD," in *Proceedings of eurosensors conference. southampton, uk. 13-16 sept. 1998*, N. M. White, Ed., 1998.
- [94] D. J. Young, V. Malba, O. Jia-Jiunn, A. F. Bernhardt, and B. E. Boser, "A low-noise rf voltage-controlled oscillator using on-chip high-q three-dimensional coil inductor and micromachined variable capacitor," in *Technical digest solid-state sensor and actuator workshop. hilton head island, sc*, 1998.

- [95] C. D. Boles, B. E. Boser, B. H. Hasegawa, and J. A. Heanue, "A multi-mode digital detector readout for solid-state medical imaging detectors," in *Proceedings of 1997 IEEE Symposium on VLSI Circuits. Kyoto, Japan. Japan Soc. Appl. Phys., IEEE Solid-State Circuits Soc., IEICE of Japan. 12-14 June 1997*, 1997.
- [96] B. E. Boser, "Electronics for micromachined inertial sensors," in *Proceedings of International Solid State Sensors and Actuators Conference (Transducers '97). Chicago, IL, 1997*.
- [97] B. Boser, "Capacitive interfaces for monolithic sensors," in *AACD*, R. J. van de Plassche, J. H. Huijsing, and W. M. C. Sansen, Eds., vol. RF analog-to-digital converters; sensor and actuator interfaces; low-noise oscillators; PLLs and synthesizers, Como, Italy: Kluwer Academic Publishers, 1997.
- [98] M. A. Lemkin, B. E. Boser, D. Auslander, and J. H. Smith, "A 3-axis force balanced accelerometer using a single proof-mass," in *Proceedings of International Solid State Sensors and Actuators Conference (Transducers '97). Chicago, IL, 1997*.
- [99] M. A. Lemkin, M. A. Ortiz, N. Wongkomet, B. E. Boser, and J. H. Smith, "A 3-axis surface micromachined sigma delta accelerometer," in *1997 IEEE International Solid-State Circuits Conference. Digest of Technical Papers. San Francisco, CA*, J. H. Wuorinen, Ed., 1997.
- [100] D. J. Young and B. E. Boser, "A micromachine-based RF low-noise voltage-controlled oscillator," in *Proceedings of CICC 97 - Custom Integrated Circuits Conference. Santa Clara, CA, 1997*.
- [101] D. J. Young, V. Malba, J. J. Ou, A. F. Bernhardt, and B. E. Boser, "Monolithic high-performance three-dimensional coil inductors for wireless communication applications," in *International Electron Devices Meeting. IEDM Technical Digest. Washington, DC, 1997*.
- [102] B. E. Boser and R. T. Howe, "Surface micromachined accelerometers," in *IEEE 1995 Custom Integrated Circuits Conference. Santa Clara, CA, 1996*.
- [103] B. E. Boser and K. W. Markus, "Design of integrated MEMs," in *Emerging Technologies: Designing Low Power Digital Systems. Atlanta, GA*, I. Cavin R. K. and W. Liu, Eds., 1996.
- [104] B. Boser, "Surface micromachining—an IC-compatible sensor technology," in *Hotchips*, vol. VIII, Stanford, 1996.
- [105] M. A. Lemkin, B. E. Boser, and D. M. Auslander, "A fully differential lateral  $\sigma$ ; $\delta$  accelerometer with drift cancellation circuitry," in *Technical Digest Solid-State Sensor and Actuator Workshop. Hilton Head Island, SC, 1996*.
- [106] M. Lemkin and B. E. Boser, "A micromachined fully differential lateral accelerometer," in *Proceedings of Custom Integrated Circuits Conference. San Diego, CA, 1996*.
- [107] D. J. Young and B. E. Boser, "A micromachined variable capacitor for monolithic low-noise VCOS [in cellular phone application]," in *Technical Digest Solid-State Sensor and Actuator Workshop. Hilton Head Island, SC, 1996*.
- [108] B. E. Boser and B. T. Howe, "Surface micromachined accelerometers," in *Proceedings of the IEEE 1995 Custom Integrated Circuits Conference. Santa Clara, CA, 1995*, pp. 337–344.

- [109] J. A. Heanue, B. E. Boser, and B. H. Hasegawa, "Cmos readout electronics for an emission-transmission medical imaging system," in *Proceedings of 1994 ieee nuclear science symposium - nss'94. norfolk, va*, 1995.
- [110] C. Lu, M. Lemkin, and B. E. Boser, "A monolithic surface micromachined accelerometer with digital output," in *Proceedings isscc '95 - international solid-state circuits conference. san francisco, ca*, J. H. Wuorinen, Ed., 1995, pp. 160–1.
- [111] I. Guyon, B. Boser, and V. Vapnik, "Automatic capacity tuning of very large vc-dimension classifiers," in *Advances in neural information processing systems*, vol. 5, Denver, Colorado: Morgan Kaufmann Publishers, 1993, pp. 147–155.
- [112] B. E. Boser, I. M. Guyon, and V. N. Vapnik, "A training algorithm for optimal margin classifiers," in *Proceedings of the fifth annual acm workshop on computational learning theory. pittsburgh, pa*, 1992, pp. 144–152. DOI: 10.1145/130385.130401.
- [113] B. Boser, E. Sackinger, J. Bromley, Y. Le Cun, R. E. Howard, and L. D. Jackel, "Hardware requirements for neural network pattern classifiers: A case study and implementation," in *From pixels to features iii: Frontiers in handwriting recognition*, S. Impedovo and J. C. Simon, Eds., Bonas, France: Elsevier Science Publishers B. V., 1992, pp. 467–478.
- [114] I. Guyon, B. E. Boser, V. Vapnik, L. Bottou, and S. A. Solla, "Structural risk minimization for character recognition," in *Advances in neural information processing systems*, vol. 4, Denver, Colorado: Morgan Kaufmann Publishers, 1992, pp. 471–9.
- [115] I. Guyon, V. Vapnik, B. Boser, L. Bottou, and S. A. Solla, "Capacity control in linear classifiers for pattern recognition," in *Proceedings. 11th iapr international conference on pattern recognition. vol.ii. conference b: Pattern recognition methodology and systems. the hague, netherlands. int. assoc. pattern recognition. 30 aug.-3 sept. 1992*, 1992. DOI: 10.1109/ICPR.1992.201798.
- [116] E. Sackinger, B. E. Boser, and L. D. Jackel, "A neurocomputer board based on the anna neural network chip," in *Advances in neural information processing systems*, vol. 4, Denver, Colorado: Morgan Kaufmann Publishers, 1992, pp. 773–780.
- [117] B. E. Boser and E. Sackinger, "An analog neural network processor with programmable network topology," in *1991 ieee international solid-state circuits conference. digest of technical papers. 34rd isscc.*, L. Winner, Ed., vol. 34, San Francisco, CA: IEEE, 1991, pp. 184–5.
- [118] B. E. Boser, E. Sackinger, J. Bromley, Y. LeCun, R. E. Howard, and L. D. Jackel, "An analog neural network processor and its application to high-speed character recognition," in *Ijcn-91-seattle: International joint conference on neural networks (cat. no.91ch3049-4). seattle, wa*, 1991.
- [119] H. P. Graf, E. Sackinger, B. Boser, and L. D. Jackel, "Recent developments of electronic neural nets in the us and canada," in *Proceedings of the 2nd international conference on microelectronics for neural networks. munich, germany. 16-18 oct. 1991*, U. Ramacher, U. Ruckert, and J. A. Nossek, Eds., 1991.



- [120] L. D. Jackel, H. P. Graf, B. Boser, J. S. Denker, Y. Le Cun, D. Henderson, R. E. Howard, O. Matan, and H. S. Baird, "Hardware considerations for neural-net character recognition systems," in *From pixels to features ii. parallelism in image processing. proceedings of a workshop. bonas, france. 27 aug.-1 sept. 1990*, H. Burkhardt, Y. Neuvo, and J. C. Simon, Eds., 1991.
- [121] L. D. Jackel, C. E. Stenard, H. S. Baird, B. Boser, J. Bromley, C. J. C. Burges, J. S. Denker, H. P. Graf, D. Henderson, R. E. Howard, W. Hubbard, Y. LeCun, O. Matan, E. Pednault, W. Satterfield, E. Sackinger, and T. Thompson, "A neural network approach to handprint character recognition," in *Compcn spring '91. digest of papers (cat. no.91ch2961-1). san francisco, ca*, 1991.
- [122] R. E. Howard, B. Boser, J. S. Denker, H. P. Graf, D. Henderson, W. Hubbard, L. D. Jackel, Y. Le Cun, and H. S. Baird, "Optical character recognition: A technology driver for neural networks," in *1990 ieee international symposium on circuits and systems (cat. no.90ch2868-8). new orleans, la*, 1990.
- [123] L. D. Jackel, B. Boser, J. S. Denker, H. P. Graf, Y. Le Cun, I. Guyon, D. Henderson, R. E. Howard, W. Hubbard, O. Matan, and S. A. Solla, "Hardware for neural-net optical character recognition," in *Advanced neural computers. neuss, west germany. air force office sci. res.. defence adv. res. agency. et al. 22-24 march 1990*, R. Eckmiller, Ed., 1990.
- [124] L. D. Jackel, B. Boser, J. S. Denker, H. P. Graf, Y. Le Cun, I. Guyon, D. Henderson, R. E. Howard, W. Hubbard, and S. A. Solla, "Hardware requirements for neural-net optical character recognition," in *Ijcnns international joint conference on neural networks (cat. no.90ch2879-5). san diego, ca*, 1990.
- [125] L. D. Jackel, B. Boser, H. P. Graf, J. S. Denker, Y. Le Cun, D. Henderson, O. Matan, R. E. Howard, and K. S. Baird, "Vlsi implementations of electronic neural networks: An example in character recognition," in *1990 ieee international conference on systems, man and cybernetics conference proceedings (cat. no.90ch2930-6). los angeles, ca*, 1990.
- [126] L. D. Jackel, B. Boser, H. P. Graf, J. S. Denker, Y. Le Cun, and R. E. Howard, "Electronic neural-net hardware," in *Neural networks: Biological computers or electronic brains. lyon, france. 6-8 march 1990*, 1990.
- [127] Y. Le Cun, L. D. Jackel, B. Boser, J. S. Denker, H. P. G. I. Graf, D. Henderson, R. E. Howard, and W. Hubbard, "Handwritten digit recognition: Applications of neural net chips and automatic learning," in *Neurocomputing, algorithms, architectures and applications. proceedings of the nato advanced research workshop. les arcs, france. 27 feb.-3 march 1989*, F. F. Soulie and J. Herault, Eds., 1990.
- [128] Y. Le Cun, L. D. Jackel, H. P. Graf, B. Boser, J. S. Denker, I. Guyon, D. Henderson, R. E. Howard, W. Hubbard, and S. A. Solla, "Optical character recognition and neural-net chips," in *Innc 90 paris. international neural network conference. paris, france. thomsom. sun. british comput. soc.. et al. 9-13 july 1990*, 1990.

- [129] Y. Le Cun, O. Matan, B. Boser, J. S. Denker, D. Henderson, R. E. Howard, W. Hubbard, L. D. Jacket, and H. S. Baird, “Handwritten zip code recognition with multilayer networks,” in *Proceedings. 10th international conference on pattern recognition (cat. no.90ch2898-5). atlantic city, nj*, 1990.
- [130] Y. LeCun, B. E. Boser, J. S. Denker, D. Henderson, R. E. Howard, and L. D. Jackel, “Handwritten digit recognition with a back-propagation neural network,” in *Advances in neural information processing systems*, D. S. Touretzky, Ed., vol. 2, Denver, Colorado: Morgan Kaufmann Publishers, 1990, pp. 396–404.
- [131] B. E. Boser and B. A. Wooley, “Design of a CMOS second-order sigma-delta modulator,” in *1988 ieee international solid-state circuits conference. digest of technical papers. 31st isscc. first edition. san francisco, ca*, L. Winner, Ed., 1988. DOI: 10.1109/ISSCC.1988.663717.
- [132] —, “Quantization error spectrum of sigma-delta modulators,” in *1988 ieee international symposium on circuits and systems. proceedings (cat. no.88ch2458-8). espoo, finland. ieee. 7-9 june 1988*, 1988. DOI: 10.1109/ISCAS.1988.15411.

## Patents

- [1] B. E. Boser, D. A. Horsley, H.-Y. Tang, and Y. Lu, “Miniature ultrasonic imaging system,” US Patent App. 15/065,621, Mar. 2016.
- [2] B. E. Boser, R. J. Przybyla, A. Guedes, D. A. Horsley, and S. E. Shelton, “In-air ultrasonic rangefinding and angle estimation,” US Patent App. 15/090,253, Apr. 2016.
- [3] B. Boser, D. Horsley, R. Przybyla, O. Rozen, and S. Shelton, “Variable thickness diaphragm for a wideband robust piezoelectric micromachined ultrasonic transducer (pmut),” US Patent App. 15/135,321, Apr. 2016.
- [4] B. Boser, R. Przybyla, and H.-Y. Tang, “Frequency tuning and/or frequency tracking of a mechanical system with low sensitivity to electrical feedthrough,” US Patent App. 15/226,470, Aug. 2016.
- [5] M. Anwar, B. Boser, and C. Park, “Procédés, systèmes et dispositifs permettant d’imager des tumeurs microscopiques,” WO Patent App. PCT/US2014/056,788, Mar. 2015.
- [6] Y. Lu, D. Horsley, H. Tang, and B. Boser, “Système d’identification d’empreintes digitales à transducteurs ultrasonores micro-usinés (mut),” WO Patent App. PCT/US2014/046,557, Jan. 2015.
- [7] I. Izyumin, B. Boser, and M. Kline, “Gyroscope à lecture de fréquence,” WO Patent App. PCT/US2013/074,835, Jun. 2014.
- [8] O. Florescu, B. Boser, and M. Mattmann, “Integrated magnetic field generation and detection platform,” US Patent 8,614,572, Dec. 2013.

- [9] A. Partridge, B. Boser, C. Lu, and M. Lutz, "Temperature measurement system having a plurality of microelectromechanical resonators and method of operating same," US Patent 7,446,619, Nov. 2008.
- [10] A. Partridge, B. Boser, C. Lu, M. Lutz, and P. Hagelin, "Microelectromechanical oscillator and method of operating same," US Patent 7,369,004, May 2008.
- [11] B. Boser, C. Lu, and A. Partridge, "Microelectromechanical multi-stage oscillator," US Patent App. 11/417,951, Nov. 2007.
- [12] A. Partridge, B. Boser, C. Lu, and M. Lutz, "Microelectromechanical oscillator having temperature measurement system, and method of operating same," US Patent App. 11/493,226, Dec. 2007.
- [13] T. Aytur, P. Beatty, B. Boser, M. Anwar, and E. Harris, "Method and apparatus for detecting substances of interest," US Patent App. 10/453,846, Feb. 2004.
- [14] P. Krulevitch, H. Ackler, F. Becker, B. Boser, A. Eldredge, C. Fuller, P. Gascoyne, J. Hamilton, S. Swierkowski, and X. Wang, "Microfabricated ac impedance sensor," US Patent 6,437,551, Aug. 2002.
- [15] B. Boser, I. Guyon, and V. Vapnik, "Pattern recognition system using support vectors," US Patent 5,649,068, Jul. 1997.
- [16] B. Boser, "Operational speed improvement for neural networks," US Patent 5,271,090, Jul. 1995.
- [17] B. Boser and E. Sackinger, "Electronic synapse circuit for artificial neural network," US Patent 5,274,748, Dec. 1993.