

# Stanford

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## Bruce A. Wooley

The Robert L. and Audrey S. Hancock Professor in the School of Engineering,  
Emeritus

Electrical Engineering

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### Bio

#### BIO

Bruce Wooley is the Robert L. and Audrey S. Hancock Professor of Engineering, Emeritus, in the Department of Electrical Engineering at Stanford University. He received a Ph.D. degree in Electrical Engineering from the University of California, Berkeley in 1970, and from 1970 to 1984 he was a member of the research staff at Bell Laboratories in Holmdel, NJ. He joined the faculty at Stanford in 1984. At Stanford he has served as the Chair of the Department of Electrical Engineering, the Senior Associate Dean of Engineering and the Director of the Integrated Circuits Laboratory. His research is in the field of integrated circuit design, where his interests include low-power mixed-signal circuit design, oversampling analog-to-digital and digital-to-analog conversion, circuit design techniques for video and image data acquisition, high-speed embedded memory, high-performance packaging and testing, and circuits for wireless and wireline communications.

Prof. Wooley is a Fellow of the IEEE and a past President of the IEEE Solid-State Circuits Society. He has served as the Editor of the IEEE Journal of Solid-State Circuits and as the Chairman of both the International Solid-State Circuits Conference (ISSCC) and the Symposium on VLSI Circuits. Awards he has received include the University Medal from the University of California, Berkeley, the IEEE Journal of Solid-State Circuits Best Paper Award, the Outstanding Alumnus Award from the EECS Department at the University of California, Berkeley, and the IEEE Donald O. Pederson Award in Solid-State Circuits.

#### ACADEMIC APPOINTMENTS

- Emeritus Faculty, Acad Council, Electrical Engineering

#### ADMINISTRATIVE APPOINTMENTS

- Chair, IEEE Awards Board, (2011-2012)
- President, IEEE Solid-State Circuits Society, (2000-2001)
- Chair, Department of Electrical Engineering, Stanford University, (1999-2008)
- Senior Associate Dean, Faculty and Academics, School of Engineering, Stanford University, (1998-1999)
- Chair, Department of Electrical Engineering, Stanford University, (1996-1997)
- Director, Integrated Circuits Laboratory, Stanford University, (1992-1999)
- Program Chair, IEEE Symposium on VLSI Circuits, (1990-1990)
- Editor, IEEE Journal of Solid-State Circuits, (1986-1989)
- Chair, IEEE International Solid-State Circuits Conference, (1981-1981)

#### HONORS AND AWARDS

- University Medal, University of California, Berkeley (1966)
- Fellow, IEEE
- Outstanding Alumnus, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley (2003)

- Donald O. Pederson Award in Solid-State Circuits, IEEE (2005)

## PROFESSIONAL EDUCATION

- PhD, University of California, Berkeley , Electrical Engineering (1970)
- MS, University of California, Berkeley , Electrical Engineering (1968)
- BS, University of California, Berkeley , Electrical Engineering (1966)

## Publications

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### PUBLICATIONS

- **Real-time, continuous, fluorescence sensing in a freely-moving subject with an implanted hybrid VCSEL/CMOS biosensor** *BIOMEDICAL OPTICS EXPRESS*  
O'Sullivan, T. D., Heitz, R. T., Parashurama, N., Barkin, D. B., Wooley, B. A., Gambhir, S. S., Harris, J. S., Levi, O.  
2013; 4 (8): 1332-1341
- **A CMOS Oversampled Closed-loop DAC with Embedded Filtering** *9th IEEE Asian Solid-State Circuits Conference (A-SSCC)*  
Ding, X., Su, D. K., Wooley, B. A.  
IEEE.2013: 389-392
- **A Compact 120-MHz 1.8V/1.2V Dual-Output DC-DC Converter with Digital Control** *35th Annual IEEE Custom Integrated Circuits Conference (CICC) - The Showcase for Circuit Design in the Heart of Silicon Valley*  
Arora, S., Su, D. K., Wooley, B. A.  
IEEE.2013
- **Real-time, continuous, fluorescence sensing in a freely-moving subject with an implanted hybrid VCSEL/CMOS biosensor.** *Biomedical optics express*  
O'Sullivan, T. D., Heitz, R. T., Parashurama, N., Barkin, D. B., Wooley, B. A., Gambhir, S. S., Harris, J. S., Levi, O.  
2013; 4 (8): 1332-1341
- **BeamCal Instrumentation IC: Design, Implementation, and Test Results** *IEEE TRANSACTIONS ON NUCLEAR SCIENCE*  
Abusleme, A., Dragone, A., Haller, G., Wooley, B. A.  
2012; 59 (3): 589-596
- **A Quadrature LO Generator Using Bidirectionally-Coupled Oscillators for 60-GHz Applications** *33rd IEEE Annual Custom Integrated Circuits Conference (CICC) - The Showcase for Circuit Design in the Heart of Silicon Valley*  
Hekmat, M., Su, D. K., Wooley, B. A.  
IEEE.2011
- **BeamCal Instrumentation IC: Design, Implementation and Test Results** *IEEE Nuclear Science Symposium/Medical Imaging Conference (NSS/MIC)/18th International Workshop on Room-Temperature Semiconductor X-Ray and Gamma-Ray Detectors*  
Abusleme, A., Dragone, A., Haller, G., Wooley, B. A.  
IEEE.2011: 758-765
- **Zero-Pole Modulation and Demodulation for Noise Reduction in Charge Amplifiers** *33rd IEEE Annual Custom Integrated Circuits Conference (CICC) - The Showcase for Circuit Design in the Heart of Silicon Valley*  
Jaffari, N., Vleugels, K., Wooley, B. A.  
IEEE.2011
- **A High-Resolution Low-Power Incremental Sigma Delta ADC With Extended Range for Biosensor Arrays** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Agah, A., Vleugels, K., Griffin, P. B., Ronaghi, M., Plummer, J. D., Wooley, B. A.  
2010; 45 (6): 1099-1110
- **A Stacked 6.5-GHz 29.6-dBm Power Amplifier in Standard 65-nm CMOS** *32nd Annual Custom Integrated Circuits Conference CICC*  
Fathi, M., Su, D. K., Wooley, B. A.  
IEEE.2010
- **Second generation monolithic full-depletion radiation sensor with integrated CMOS circuitry** *IEEE Nuclear Science Symposium (NSS)/Medical Imaging Conference (MIC)/17th International Workshop on Room-Temperature Semiconductor X-ray and Gamma-ray Detectors*  
Segal, J. D., Kenney, C. J., Parker, S. I., Aw, C. H., Snoeys, W. J., Wooley, B., Plummer, J. D.

IEEE.2010: 1896–1900

- **A 5-GHz Wireless LAN Transmitter with Integrated Tunable High-Q RF Filter** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Wiser, R. F., Zargari, M., Su, D. K., Wooley, B. A.  
2009; 44 (8): 2114-2125
- **A 0.7-V 870-mu W Digital-Audio CMOS Sigma-Delta Modulator** *IEEE Symposium on VLSI Circuits*  
Park, H., Nam, K., Su, D. K., Vleugels, K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2009: 1078–88
- **Design and Implementation of a CMOS 802.11n SoC** *IEEE COMMUNICATIONS MAGAZINE*  
Sankaran, S. G., Zargari, M., Nathawad, L. Y., Samavati, H., Mehta, S. S., Kheirkhahi, A., Chen, P., Gong, K., Vakili-Amini, B., Hwang, J. A., Chen, S. M., Terrovitis, M., Kaczynski, et al  
2009; 47 (4): 134-143
- **A Digitally Modulated Polar CMOS Power Amplifier With a 20-MHz Channel Bandwidth** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Kavousian, A., Su, D. K., Hekmat, M., Shirvani, A., Wooley, B. A.  
2008; 43 (10): 2251-2258
- **A 77-dB dynamic range, 7.5-MHz hybrid continuous-time/discrete-time cascaded Sigma Delta modulator** *20th Symposium on VLSI Circuits*  
Kulchychki, S. D., Trofin, R., Vleugels, K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2008: 796–804
- **A 0.7-V 100-dB 870-mu W digital audio Sigma Delta modulator** *IEEE Symposium on VLSI Circuits*  
Park, H., Nam, K., Su, D. K., Vleugels, K., Wooley, B. A.  
IEEE.2008: 178–179
- **A 5-GHz Wireless LAN Transmitter with Integrated Tunable High-Q RF Filter** *IEEE Custom Integrated Circuits Conference*  
Wiser, R. F., Zargari, M., Su, D., Wooley, B. A.  
IEEE.2008: 607–610
- **A 0.7-V 100-dB 870-mu W digital audio Sigma Delta modulator** *IEEE Symposium on VLSI Circuits*  
Park, H., Nam, K., Su, D. K., Vleugels, K., Wooley, B. A.  
IEEE.2008: 139–140
- **A high-resolution low-power oversampling ADC with extended-range for bio-sensor Arrays** *20th Symposium on VLSI Circuits*  
Agah, A., Vleugels, K., Griffin, P. B., Rodaghi, M., Plummer, J. D., Wooley, B. A.  
JAPAN SOCIETY APPLIED PHYSICS.2007: 244–245
- **A 1.2-v 77-dB 7.5-MHz continuous-time/discrete-time cascaded Sigma Delta modulator** *20th Symposium on VLSI Circuits*  
Kulchychki, S. D., Trofin, R., Vleugels, K., Wooley, B. A.  
JAPAN SOCIETY APPLIED PHYSICS.2007: 238–239
- **A 1.9-GHz single-chip CMOS PHS cellphone** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Si, W. W., Mehta, S., Samavati, H., Terrovitis, M., Mack, M., Onodera, K., Jen, S., Luschas, S., Hwang, J., Mendis, S., Su, D., Wooley, B.  
2006; 41 (12): 2737-2745
- **A CMOS oversampled DAC with multi-bit semi-digital filtering and boosted subcarrier SNR for ADSL central office modems** *Symposium on VLSI Circuits*  
Lin, A. C., Su, D. K., Hester, R. K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2006: 868–75
- **Per-pixel floating-point ADCs with electronic shutters for a high dynamic range, high frame rate infrared focal plane array** *IEEE Custom Integrated Circuits Conference*  
Lee, S., Park, H., Wooley, B. A.  
IEEE.2006: 647–650
- **An 802.11g WLAN SoC** *IEEE International Solid-State Circuits Conference (ISSCC 2005)*  
Mehta, S. S., Weber, D., Terrovitis, M., Onodera, K., Mack, M. P., Kaczynski, B. J., Samavati, H., Jen, S. H., Si, W. W., Lee, M., Singh, K., Mendis, S., Husted, et al  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2005: 2483–91

- **A low-voltage low-power sigma-delta modulator for broadband analog-to-digital conversion** *IEEE Custom Integrated Circuits Conference*  
Nam, K. Y., Lee, S. M., Su, D. K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2005: 1855–64
- **A 150-MS/s 8-b 71-mW CMOS time-interleaved ADC** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Limotyarakis, S., Kulchycki, S. D., Su, D. K., Wooley, B. A.  
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- **A CMOS oversampling D/A converter with multi-bit semi-digital filtering and boosted subcarrier SNR for ADSL central office modems** *Symposium on VLSI Circuits*  
Lin, A. C., Su, D. K., Hester, R. K., Wooley, B. A.  
JAPAN SOCIETY APPLIED PHYSICS.2005: 126–129
- **A single-chip dual-band tri-mode CMOS transceiver for IEEE 802.11a/b/g wireless LAN** *IEEE International Solid-State Circuits Conference*  
Zargari, M., Terrovitis, M., Jen, S. H., Kaczynski, B. J., Lee, M., Mack, M. P., Mehta, S. S., Mendis, S., Onodera, K., Samavati, H., Si, W. W., Singh, K., Tabatabaei, et al  
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- **An 8-Gb vertical bar s vertical bar pin simultaneously bidirectional transceiver in 0.35- $\mu$ m CMOS** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Drost, R. J., Wooley, B. A.  
2004; 39 (11): 1894-1908
- **A CMOS oversampling bandpass cascaded D/A converter with digital FIR and current-mode semi-digital filtering** *Symposium on VLSI Circuits*  
Barkin, D. B., Lin, A. C., Su, D. K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2004: 585–93
- **A 1.2-V 15-bit 2.5-MS/s oversampling ADC with reduced integrator swings** *IEEE Custom Integrated Circuits Conference*  
Nam, K. Y., Lee, S. M., Su, D. K., Wooley, B. A.  
IEEE.2004: 515–518
- **A single-chip dual-band tri-mode CMOS transceiver for IEEE 802.11a/b/g WLAN** *IEEE International Solid-State Circuits Conference*  
Zargari, M., Jen, S., Kaczynski, B., Lee, M., Mack, M., Mehta, S., Mendis, S., Onodera, K., Samavati, H., Si, W. M., Singh, K., Tabatabaei, A., Terrovitis, et al  
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- **A 150MS/s 8b 71mW time-interleaved ADC in 0.18  $\mu$ m CMOS** *IEEE International Solid-State Circuits Conference*  
Limotyarakis, S., Kulchycki, S. D., Su, D., Wooley, B. A.  
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- **Photonic A/D conversion using low-temperature-grown GaAs MSM switches integrated with Si-CMOS** *JOURNAL OF LIGHTWAVE TECHNOLOGY*  
Urata, R., Nathawad, L. Y., Takahashi, R., Ma, K., Miller, D. A., Wooley, B. A., Harris, J. S.  
2003; 21 (12): 3104-3115
- **A 40-GHz-bandwidth, 4-bit, time-interleaved A/D converter using photoconductive sampling** *IEEE International Solid-State Circuits Conference*  
Nathawad, L. Y., Urata, R., Wooley, B. A., Miller, D. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2003: 2021–30
- **A multichannel pipeline analog-to-digital converter for an integrated 3-D ultrasound imaging system** *28th European Solid-State Circuit Conference/32nd European Solid-State Device Research Conference*  
Kaviani, K., Oralkan, O., Khuri-Yakub, P., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2003: 1266–70
- **SoC: DOA? RIP?** *IEEE International Solid-State Circuits Conference*  
Wooley, B., Buss, D., Hansen, K., Alwood, G., Mangelsdorf, C., Mertens, R.  
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- **Cascaded noise-shaping modulators for oversampled data conversion** *25th Annual Custom Integrated Circuits Conference*  
Wooley, B. A.  
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- **A 20GHz bandwidth, 4b photoconductive-sampling time-interleaved CMOS ADC** *IEEE International Solid-State Circuits Conference*

- Nathawad, L. Y., Urata, R., Wooley, B. A., Miller, D. A.  
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- **A CMOS oversampling bandpass cascaded D/A converter with digital FIR and current-mode semi-digital filtering** *Symposium on VLSI Circuits*  
Barkin, D. B., Lin, A. C., Su, D. K., Wooley, B. A.  
JAPAN SOCIETY APPLIED PHYSICS.2003: 79-82
  - **A 5-GHz CMOS transceiver for IEEE 802.11a wireless LAN systems** *IEEE International Solid-State Circuits Conference (ISSCC 2001)*  
Zargari, M., Su, D. K., Yue, C. P., Rabii, S., Weber, D., Kaczynski, B. J., Mehta, S. S., Singh, K., Mendis, S., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2002: 1688-94
  - **A CMOS RF power amplifier with parallel amplification for efficient power control** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Shirvani, A., Su, D. K., Wooley, B. A.  
2002; 37 (6): 684-693
  - **Analysis and simulation of distortion in folding and interpolating A/D converters** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS II-EXPRESS BRIEFS*  
Limotyakis, S., Nam, K., Wooley, B. A.  
2002; 49 (3): 161-169
  - **Ultrafast sampling using low temperature grown GaAs MSM switches integrated with CMOS amplifier for photonic A/D conversion** *15th Annual Meeting of the IEEE-Lasers-and-Electro-Optics-Society*  
Urata, R., Nathawad, L. Y., Ma, K., Takahashi, R., Miller, D. A., Wooley, B. A., Harris, J. S.  
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  - **A 2.5-V sigma-delta modulator for broadband communications applications** *IEEE International Solid-State Circuits Conference (ISSCC 2001)*  
Vleugels, K., Rabii, S., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2001: 1887-99
  - **Measuring and modeling the effects of substrate noise on the LNA for a CMOS GPS receiver** *IEEE Custom Integrated Circuits Conference*  
Xu, M., Su, D. K., Shaeffer, D. K., Lee, T. H., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2001: 473-85
  - **A 15-b pipelined CMOS floating-point A/D converter** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Thompson, D. U., Wooley, B. A.  
2001; 36 (2): 299-303
  - **A two-path bandpass sigma-delta modulator with extended noise shaping** *International Solid-State Circuits Conference*  
Tabatabaei, A., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.2000: 1799-1809
  - **Measuring and modeling the effects of substrate noise on the LNA for a CMOS GPS receiver** *22nd Annual Custom Integrated Circuits Conference (CICC 2000)*  
Xu, M., Su, D. K., Shaeffer, D. K., Lee, T. H., Wooley, B. A.  
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  - **A BICMOS active substrate probe-card technology for digital testing** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Zargari, M., Leung, J., Wong, S. S., Wooley, B. A.  
1999; 34 (8): 1118-1135
  - **The efficiency of methods for measuring A D converter linearity** *IEEE TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT*  
Capofreddi, P. D., Wooley, B. A.  
1999; 48 (3): 763-769
  - **A 14-bit, 10-Msamples/s D/A converter using multibit Sigma Delta modulation** *Symposium on VLSI Circuits*  
Falakshahi, K., Yang, C. K., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1999: 607-15
  - **A continuously calibrated 12-b, 10-MS/s, 3.3-V A/D converter** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Ingino, J. M., Wooley, B. A.  
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- **A two-path bandpass Sigma Delta modulator for digital IF extraction at 20 MHz** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
ONG, A. K., Wooley, B. A.  
1997; 32 (12): 1920-1934
- **The use of linear models in A/D converter testing** *IEEE TRANSACTIONS ON CIRCUITS AND SYSTEMS I-REGULAR PAPERS*  
Capofreddi, P. D., Wooley, B. A.  
1997; 44 (12): 1105-1113
- **A 1.8-V digital-audio sigma-delta modulator in 0.8- $\mu$ m CMOS** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Rabii, S., Wooley, B. A.  
1997; 32 (6): 783-796
- **A two-path bandpass Sigma Delta modulator for digital IF extraction at 20MHz** *1997 IEEE International Solid-State Circuits Conference*  
ONG, A. K., Wooley, B. A.  
I E E E.1997: 212-213
- **A 128x128-pixel standard-CMOS image sensor with electronic shutter** *1996 International Solid-State Circuits Conference (ISSCC)*  
Aw, C. H., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1996: 1922-30
- **A 900-MHz RF front-end with integrated discrete-time filtering** *1996 International Solid-State Circuits Conference (ISSCC)*  
Shen, D. H., Hwang, C. M., LUSIGNAN, B. B., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1996: 1945-54
- **A 1,3-ns 32-wordx32-bit three-port BICMOS register file** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Chao, C. C., Wooley, B. A.  
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- **A 250-MHz skewed-clock pipelined data buffer** *1995 Custom Integrated Circuits Conference*  
Heshami, M., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1996: 376-83
- **Experimental results and modeling of noise coupling in a lightly doped substrate** *1996 International Electron Devices Meeting*  
Blalack, T., Lau, J., Clement, F. J., Wooley, B. A.  
IEEE.1996: 623-626
- **A 1.8V, 5.4mW, digital-audio Sigma Delta modulator in 1.2  $\mu$ m CMOS** *1996 IEEE International Solid-State Circuits Conference*  
Rabii, S., Wooley, B. A.  
I E E E.1996: 228-229
- **A 128x128-pixel standard-CMOS image sensor with electronic shutter** *1996 IEEE International Solid-State Circuits Conference*  
Aw, C. H., Wooley, B. A.  
I E E E.1996: 180-181
- **A BICMOS active substrate probe card technology for digital testing** *1996 IEEE International Solid-State Circuits Conference*  
Zargari, M., Leung, J. T., Wong, S. S., Wooley, B. A.  
I E E E.1996: 308-309
- **A 900MHz integrated discrete-time filtering RF front-end** *1996 IEEE International Solid-State Circuits Conference*  
Shen, D. H., Hwang, C. M., LUSIGNAN, B., Wooley, B. A.  
I E E E.1996: 54-55
- **A CMOS multichannel IC for pulse timing measurements with 1-mV sensitivity** *International Solid-State Circuits Conference (ISSCC)*  
Loinaz, M. J., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1995: 1339-49
- **THE EFFECTS OF SWITCHING NOISE ON AN OVERSAMPLING A/D CONVERTER** *1995 IEEE International Solid-State Circuits Conference*  
Blalack, T., Wooley, B. A.  
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Capofreddi, P. D., Wooley, B. A.  
IEEE.1995: 54–60
- **Active substrate membrane probe card** *1995 International Electron Devices Meeting*  
Leung, J., Zargari, M., Wooley, B. A., Wong, S. S.  
IEEE.1995: 709–712
- **A CMOS MULTI-CHANNEL IC FOR PULSE TIMING MEASUREMENTS WITH 1MV SENSITIVITY** *1995 IEEE International Solid-State Circuits Conference*  
Loinaz, M. J., Wooley, B. A.  
IEEE.1995: 50–51
- **A 250-MHz skewed-clock pipelined dual-port embedded DRAM** *IEEE 1995 Custom Integrated Circuits Conference*  
Heshami, M., Wooley, B. A.  
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- **THE EFFECTS OF IMPACT IONIZATION ON THE OPERATION OF NEIGHBORING DEVICES AND CIRCUITS** *IEEE TRANSACTIONS ON ELECTRON DEVICES*  
Sakui, K., Wong, S. S., Wooley, B. A.  
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- **AN ANALOG MEMORY INTEGRATED-CIRCUITS FOR WAVE-FORM SAMPLING UP TO 900 MHZ** *Nuclear Science Symposium and Medical Imaging Conference (NSS-MIC 93)*  
HALLER, G. M., Wooley, B. A.  
IEEE-INST ELECTRICAL ELECTRONICS ENGINEERS INC.1994: 1203–7
- **A BICMOS TIME-INTERVAL DIGITIZER BASED ON FULLY-DIFFERENTIAL, CURRENT-STEERING CIRCUITS** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Loinaz, M. J., Wooley, B. A.  
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- **A LOW-POWER, AREA-EFFICIENT DIGITAL-FILTER FOR DECIMATION AND INTERPOLATION** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Brandt, B. P., Wooley, B. A.  
1994; 29 (6): 679-687
- **A 700-MHZ SWITCHED-CAPACITOR ANALOG WAVE-FORM SAMPLING CIRCUIT** *1993 Symposium on VLSI Circuits*  
HALLER, G. M., Wooley, B. A.  
IEICE-INST ELECTRON INFO COMMUN ENG.1994: 830–38
- **A 700-MHZ SWITCHED-CAPACITOR ANALOG WAVE-FORM SAMPLING CIRCUIT** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
HALLER, G. M., Wooley, B. A.  
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- **A 1.3-NS 32-WORD BY 32-BIT 3-PORT BICMOS REGISTER FILE** *1994 Bipolar/BiCMOS Circuits and Technology Meeting*  
Chao, C. C., Wooley, B. A.  
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- **AN ACTIVE SUBSTRATE MCM SYSTEM** *1994 Symposium on VLSI Circuits*  
Chao, C. C., Miyamoto, K., Sakui, K., Cheng, W. L., Wooley, B. A.  
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- **A CMOS OVERSAMPLING D/A CONVERTER WITH A CURRENT-MODE SEMIDIGITAL RECONSTRUCTION FILTER** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
Su, D. K., Wooley, B. A.  
1993; 28 (12): 1224-1233



- **A MONOLITHIC GAAS-ON-SI RECEIVER FRONT-END FOR OPTICAL INTERCONNECT SYSTEMS** *IEEE JOURNAL OF SOLID-STATE CIRCUITS*  
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Loinaz, M. J., Wooley, B. A.  
I E E E.1993: Z6-?
- **A HIGH-RESOLUTION SIGMA-DELTA MODULATOR WITH EXTENDED DYNAMIC-RANGE** *IEEE 1993 CUSTOM INTEGRATED CIRCUITS CONF*  
Williams, L. A., Wooley, B. A.  
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