IEEE Circuits and Systems Society
Analog Signal Processing Technical Committee

Annual Activity Report
2005-2006

The Analog Signal Processing (ASP) Technical Committee serves to foster research, development, education and industrial dissemination of knowledge relating to the theory, analysis, design, and practical implementation of analog circuits. The scope of the ASP Committee spans from basic scientific theory to industrial application. More information on this committee can be found on the world-wide web at http://ewh.ieee.org/soc/icss/committees/asptc.

Committee members are experts in the analog signal processing arena who are committed to and active within this field. The committee currently has about 45 active members. In 2005, Un-Ku Moon took over from Igor Filanovsky as chair. Tony Chan Carusone serves as the chair-elect and Felix Lustenberger serves as the secretary and web coordinator.

The following summarizes CASS-related activity by the ASP committee and its members during the year 2005-2006.

1. ISCAS 2006

The Analog Signal Processing (ASP) track will once again play a dominant role in ISCAS 2006 (http://www.iscas06.org), and a great majority of ASPTC members assisted in the preparation of the technical program as well as paper evaluations. During the last ASPTC meeting in Kobe, Japan (at ISCAS 2005 http://www.iscas05.org), Tony Chan Carusone was nominated and elected by the committee as the new chair-elect and Felix Lustenberger was also nominated and elected by the committee as the new secretary (also web coordinator). In the following year, as Tony Chan Carusone is to serve as the chair, Felix Lustenberger will serve as the chair-elect. New secretary will be nominated and elected at our upcoming ASPTC meeting in Kos, Greece (at ISCAS 2006).

As we have done in the past, once again for ISCAS 2006, current ASPTC chair Un-Ku Moon, chair-elect Tony Chan Carusone, and last year's chair Igor Filanovsky acted as Analog Signal Processing track co-chairs. These three coordinated the reviews of the papers submitted to this track. 437 papers (= 18% of all papers submitted to ISCAS 2006) were submitted to the Analog and Signal Processing track, of which 252 papers (= 57%) were selected for the final program.

The ISCAS 2006 review process for the ASP track went smoothly without a hitch, and this is primarily due to the service of Review Committee Member (RCM) volunteers, as listed below:

Analog Signal Processing RCMs:

Albert Wang	Illinois Institute of Technology, USA
Alyssa Apsel	Cornell University, USA
Andreas Demosthenous	University College London, UK
Antonio Lopez-Martín	Public University of Navarra, Spain
Antonio Torralba	University of Sevilla, Spain
Apisak Worapishet	Mahanakorn University of Technology, Thailand
Aydin Karsilayan	Texas A&M University, USA
Degang Chen	Iowa State University, USA

Dong-Young Chang	Bitwave Semiconductor, USA
Eduard Alarcon	Technical University of Catalunya, Spain
Felix Lustenberger	CSEM SA, Switzerland
Gabor Temes	Oregon State University, USA
Gabriel Rincon-Mora	Georgia Institute of Technology, USA
Gert Cauwenberghs	University of California San Diego, USA
Gordon Roberts	McGill University, Canada
Gu-Yeon Wei	Harvard University, USA
Hoi Lee	University of Texas at Dallas, USA
Igor Filanovsky	University of Alberta, Canada
Jin Liu	University of Texas-Dallas, USA
Jose Silva-Martinez	Texas A&M University, USA
Joseph Chang	Nanyang Technological University, Singapore
Julio Georgiou	University of Cyprus
Luis Hernandez	Carlos III University, Spain
Markus Helfenstein	Philips Semiconductors, Switzerland
Mohammed Ismail	Ohio State University, USA
Mourad N. El-Gamal	McGill University, Canada
Mustafa keskin	Qualcomm, USA
Orly Yadid-Pecht	Ben-Gurion University, Israel
P R Mukund	Rochester Institute of Technology, USA
Paul Hasler	Georgia Institute of Technology, USA
Ralph Etienne-Cummings	Johns Hopkins University, USA
Ramesh Harjani	University of Minnesota, USA
Ramon Carvajal	University of Sevilla, Spain
Randy Geiger	Iowa State University, USA
Robert Fox	University of Florida, USA
Roman Genov	University of Toronto, Canada
Sameer Sonkusale	Tufts University, USA
Shahriar Mirabbasi	University of British Columbia, Canada
Shantanu Chakrabartty	Johns Hopkins University, USA
Tertulien Ndjountche	Quebec University at Hull, Canada
Tony Chan Carusone	University of Toronto, Canada
Tuna Tarim	Texas Instruments, USA
Un-Ku Moon	Oregon State University, USA
Vadim Ivanov	Texas Instruments, USA
William Eisenstadt	University of Florida, USA
Wouter Serdijn	Delft University of Technology, Netherlands
Yichuang Sun	University of Hertfordshire, UK

Many ISCAS 2006 technical sessions will be chaired by ASPTC members, as listed below:

Sessions sponsored by Analog Signal Processing:

Amplifiers I	Igor Filanovsky
Wireless Circuits & Systems II	P R Mukund
Nyquist DACs	Shahriar Mirabbasi
Analog Circuits & IC Technology I	Antonio Lopez-Martín
Bandgap References	Hoi Lee
Oversampling Converters I	Gordon Roberts
Pipelined ADCs I	Degang Chen
Continuous-time Filters I	Yichuang Sun

Nyquist ADCs I	Ramon Carvajal
Log-domain & Complex Analog Signal Processing	Eduard Alarcon
Low Voltage Amplifiers	Vadim Ivanov
Analog Circuits & IC Technology II	Gert Cauwenberghs
Oversampling Converters II	Luis Hernandez
PLLs, ADCs, and Testing	Alyssa Apsel
Circuit Theory I	Andreas Demosthenous
CAD & Tools for Analog Design I	Tuna Tarim
Oversampling Converters III	Paul Hasler
Phase Locking	Wouter Serdijn
Mixed Signal Circuits & Testing I	Joseph Chang
Analog Circuits & IC Technology III	Gu-Yeon Wei
Nyquist ADCs II	Sameer Sonkusale
Sensor & Actuator Interface Circuits	Orly Yadid-Pecht
Oversampling Converters IV	Antonio Torralba
Switched Capacitor Circuits	Roman Genov
Wireless and Oversampling Circuits & Systems	Tony Chan Carusone
Pipelined ADCs III	Felix Lustenberger
Oversampling Converters VI	Tertulien Ndjountche
Analog Circuits & IC Technology IV	Alyssa Apsel
Circuit Theory II	Ramesh Harjani
Amplifiers II	Vadim Ivanov
Amplifiers III	Igor Filanovsky
Mixed Signal Circuits & Systems	Paul Hasler
Analog Circuits & IC Technology V	Antonio Lopez-Martín
Oversampling Converters V	Luis Hernandez
Circuit Theory III	Randy Geiger
Analog Filtering & Signal Processing	Roman Genov
Amplifiers IV	Antonio TorralbaSpain
Voltage & Current References	Gabriel Rincon-Mora
Analog Circuits & IC Technology VI	Randy Geiger
Continuous-time Filters II	Yichuang Sun
Circuit Theory IV	Andreas Demosthenous
Continuous-time Filters III	Ralph Etienne-Cummings
Analog Circuits & IC Technology VII	Sameer Sonkusale
Wireless Circuits & Systems III	P R Mukund
Oversampling Converters VII	Tertulien Ndjountche
Nyquist Circuits & Systems	Felix Lustenberger
CAD & Tools for Analog Design II	Tuna Tarim
Pipelined ADCs II	Gordon Robertsity
Mixed Signal Systems & Tools	Degang Chen
Mixed Signal Circuits & Testing II	Joseph Chang

Other activities:

TPC members: Tony Chan Carusone, Igor Filanovsky, Un-Ku Moon

Tutorial presenters: John Choma, Andreas Demosthenous

Special Sessions (Sensory Systems) organizer: Ralph Etienne-Cummings

Demonstration Sessions (Sensory Systems) organizer: Ralph Etienne-Cummings

2. **Other conferences and meetings**

Members of ASPTC are active in organizing and coordinating many other conferences and meetings in the CAS field. This is summarized in the following.

IEEE CASS Board of Governors

Tuna Tarim, Ralph Etienne-Cummings, Wouter Serdijn

IEEE SSCS representative to IEEE CASS Board of Governors

Un-Ku Moon

IEEE CAS representative to IEEE Sensors Council

Orly Yadid-Pecht

IEEE BCTM

Rob Fox, Technical Program Committee

IEEE CICC

Tony Chan Carusone, Technical Program Committee
Ramesh Harjani, Technical Program Committee
Un-Ku Moon, Technical Program Committee
Shahriar Mirabbasi, Technical Program Committee

2005 Wireless Test Workshop,

Bill Eisenstadt, Technical Program Co-Chair

ARFTG

Bill Eisenstadt, Executive Committee

Symposium on Integrated Circuits and Systems Design

Jose Silva-Martinez, Technical Program Committee

IASTED International Conference on Circuits Signals and Systems

Jose Silva-Martinez, Technical Program Committee

Mexican Symposium on Instrumentation

Jose Silva-Martinez, Technical Program Committee

NSF Telluride Neuromorphic Engineering Workshop

Ralph Etienne-Cummings, Organizer

IEEE ISSCC

Ralph Etienne-Cummings, Technical Program Committee

SPIE, BIS, NIPS, COSI

Ralph Etienne-Cummings, Technical Program Committee

SPIE Solid State Sensor Arrays International Conference

Orly Yadid-Pecht, Technical Program Committee

IEEE workshop on CCDs and Advanced Image Sensors

Orly Yadid-Pecht, Technical Program Committee

IEEE Int. Conf. on Portable Information Devices

Ramesh Harjani, Tutorial co-chair

2006 MWSCAS

Gabriel A. Rincón-Mora, Technical Program Co-Chair

IEEE PRIME

Gaetano Palumbo, Technical Program Committee

IEEE LEOS, SPIE Photonics, SPIE ITCom

Alyssa Apsel, Technical Program Committee

IEEE ICCAD, IEEE ISLPED

Gu-Yeon Wei, Technical Program Committee

IEEE ESSCIRC

Luis Hernandez: Technical Program Committee

IASTED CSS

Wouter Serdijn, Technical Program Committee

3. **Editorial boards and publications**

Members of ASPTC are active on editorial boards of IEEE and CAS-related journals and transactions, and in promoting ASP and CAS in other publications:

Editorial boards

IEEE Transactions on Circuits and Systems I:

Deputy Editor in Chief: Orly Yadid-Pecht

Associate Editor: Igor Filanovsky, Tuna Tarim, Jose Silva-Martinez, Alyssa Apsel, Wouter Serdijn, Joseph Chang

IEEE Transactions on Circuits and Systems II:

Associate Editor: Gaetano Palumbo, Alyssa Apsel, Gu-Yeon Wei, Andreas Demosthenous, Wouter Serdijn

Analog Integrated Circuits and Signal Processing

Associate Editor: John Choma, Wouter Serdijn

Journal of Applied Research and Technology

Associate Editor: Jose Silva-Martinez

IEEE Sensors Journal

Associate Editor: Ralph Etienne-Cummings

International Journal of Low-Power Electronics

Associate Editor: Wouter Serdijn

IEEE Journal of Solid-State Circuits:

Associate Editor: Un-Ku Moon

Books and book chapters

John Choma and Wai-Kai Chen, Feedback Networks: Theory and Circuit Applications, World Scientific Press, Spring 2006

Richard Schreier and Gabor Temes, Understanding Delta-Sigma Data Converters, ISBN 0-471-46585-2, John Wiley & Sons, 2005

W. R. Eisenstadt, B. Stengel, and B. Thompson, Microwave Differential Circuit Design Using Mixed-Mode S-parameters, ISBN 1-58053-933-5, Artech House, Apr. 2006

Ramesh Harjani (Editor), Topics in High-Speed Mixed-Signal Integrated Circuits, World Scientific Publishing Company, Oct. 2005

G.A. Rincón-Mora, Power Management ICs – A Top-Down Design Approach, ISBN 1-4116-6359-4, Lulu, 2005

T. Ndjountche, Dynamic Analog Circuit Techniques for Real-Time Adaptive Networks, Aachen: Shaker Verlag, (http://www.shaker-online.com)

Wouter A. Serdijn, Sandro A.P. Haddad and Jader A. De Lima: Ultra Low-Power Low-Voltage Analog Integrated Filter Design, in J.H. Huijsing, A.H.M. van Roermund and M. Steyaert (Editors) Analog Circuit Design, Kluwer Academic Publishers, 2005

Journal publications

M. Filanovsky and P.N. Matkhanov, "Synthesis of reactance networks shaping a quasi-rectangular pulse," *IEEE Trans. Circuits and Systems II*, vol. 52, no 5, pp. 242-245, May 2005

J. Sewter and A. Chan Carusone, "A CMOS Finite Impulse Response Filter with a Crossover Traveling Wave Topology for Equalization up to 30 Gb/s," *IEEE J. Solid-State Circuits*, pp. 909-917, Apr. 2006

M. Mendez-Rivera, J. Silva-Martinez, E. Sanchez-Sinencio, and A. Valdes-Garcia, "An on-chip spectrum analizer for analog built-In testing,", *Journal of Electronic Testing: Theory and Applications*, pp. 205-219, 2005

D. Hernandez-Garduno and J. Silva-Martínez, "Continuous-time common-mode feedback for high-speed switched-capacitor networks," *IEEE Journal of Solid-State Circuits*, pp. 1610-1617, Aug. 2005

C. Mishra, A. Valdes-Garcia, F. Bahmani, A. Batra, E. Sánchez-Sinencio and J. Silva-Martinez, "Frequency planning and synthesizer architectures for multiband OFDM UWB radios,", IEEE Transactions on Microwave Theory and Techniques, pp. 3744-3756, Dec 2005

D. M. Binkley, B. J. Blalock, and J. M. Rochelle, "Optimizing drain current, inversion level, and channel length in analog CMOS design," *Journal of Analog Integrated Circuits and Signal Processing*, May 2006

S. Mehta and R. Etienne-Cummings, "A normal optical flow camera," *IEEE Trans. Circuits and Systems I*, Fall 2005

S. Mehta and R. Etienne-Cummings, "Normal optical flow camera," *IEE Electronics Letters*, vol. 41, no. 13, pp. 732 – 733, Jun. 2005

B. Jung and R. Harjani, "Designing LC VCOs using capacitive degeneration techniques," *International Journal of High Speed Electronics and Systems*, Oct. 2005

Y. Ding and R. Harjani, "A CMOS high efficiency +22dBm linear power amplifier," *IEEE J. Solid-State Circuits*, vol. 40, no. 9, Sep. 2005

S. Zhou and G.A. Rincón-Mora, "A high efficiency, soft switching DC-DC converter with adaptive current-ripple control for portable applications," *IEEE Trans. Circuits Systems II*, 2005

M. Chen and G.A. Rincón-Mora, "An accurate electrical battery model capable of predicting runtime and I-V performance," *IEEE Trans. Energy Conversion*, 2005

R. Mita - G. Palumbo - S. Pennisi, "Low-Voltage High-Drive CMOS Current Feedback Op-Amp", IEEE Trans. on CAS part II, Vol. 52, No. 6, pp. 317-321, June 2005.

W. Aloisi, G. Giustolisi and G. Palumbo, “Design and comparison of very low-voltage CMOS output stages,” *IEEE Trans. CAS I*, pp. 1545-1556, Aug. 2005

W. Aloisi and G. Palumbo, “Efficiency model of boost dc-dc PWM converters,” *International Journal of Circuit Theory and Applications*, pp. 419-432, Sep. 2005

O. Cannizzaro, G. Palumbo and S. Pennisi, “Accurate estimation of high-frequency harmonic distortion in two-stage Miller OTAs,” *IEE proc. Circuits, Devices and Systems*, pp. 417-424, Oct. 2005

M. Alioto and G. Palumbo, “Modelling and design considerations on CML gates under high-current effects,” *International Journal of Circuit Theory and Applications*, pp. 503-518, Nov 2005

G. Palumbo and D. Pappalardo, “Charge pump circuits with only capacitive loads: optimized design,” *IEEE Trans. CAS II*, pp. 128-132, Feb 2006

M. Alioto and G. Palumbo, “Design strategies of cascaded CML gates", *IEEE Trans. CAS II*, pp. 85-89, Feb 2006

O. Cannizzaro, G. Palumbo and S. Pennisi, “Effects of nonlinear feedback in the frequency domain,” *IEEE Trans. CAS I*, pp. 225-234, Feb 2006

M. Alioto, A. D. Grasso and G. Palumbo, “Design of cascaded ECL gates with a power constraint,” *Electronics Letters*, vol. 42, no. 4, pp. 211-212, Feb 2006

O. Cannizzaro, G. Palumbo and S. Pennisi, “Distortion analysis of Miller-compensated three-stage amplifier", *IEEE Trans. CAS I*, May 2006

T. Ndjountche, F.-L. Luo, and R. Unbehauen, “A high-frequency double-sampling second-order delta-sigma modulator," *IEEE Trans. Circuits Syst. II*, pp. 841-845, Dec. 2005

T. Yin, A. M. Pappu and A. Apsel, “Low cost, high efficiency and high speed SiGe phototransistors in commercial BiCMOS,” *IEEE Photonics Technology Letters*, Jan. 2006

A. Pappu and A. Apsel, “Analysis of intra-chip electrical and optical fanout,” *Applied Optics*, vol. 44, no. 30, Oct. 2005

A. Worapishet and P. Sirisuk, “Efficient mismatch insensitive track-and-hold circuit using low-voltage floating-gate MOS transistors,” *IEICE Transaction on Electronics*, pp. 1148-1153, Jun. 2005

M. Panovic and A. Demosthenous, “A low-power analog motion estimation processor for digital video coding,” *IEEE J. Solid-State Circuits*, vol. 41, no. 3, pp. 673-683, Mar. 2006

I. F. Triantis and A. Demosthenous, “The effect of interference source proximity on cuff imbalance,” *IEEE Trans. Biomedical Engineering*, vol. 53, no. 2, pp. 354-357, Feb 2006

A. Demosthenous and M. Panovic, “Low-voltage MOS linear transconductor/squarer and four-quadrant multiplier for analog VLSI,” *IEEE Trans. Circuits and Systems I*, vol. 52, no. 9, pp. 1721-1731, Sep. 2005

A. Tasic, W.A. Serdijn and J.R. Long, “Adaptive voltage controlled oscillators - theory, design and application,” *IEEE Trans. Circuits Systems I*, pp. 894-901, May 2005

Jun Xu, B. Woestenburg, J.G. Bij de Vaate and W.A. Serdijn, “GaAs 0.5dB NF dual-loop negative-feedback broadband low-noise amplifier IC,” *Electronics Letters*, vol. 41, no. 14, pp. 780-782, Jul. 7, 2005

J.A. de Lima and W.A. Serdijn, “A compact nA/V triode-MOSFET transconductor,” *Electronics Letters*, vol. 41, no. 20, pp. 1113-1114, Sep. 29, 2005

S.A.P. Haddad, S. Bagga and W.A. Serdijn, “Log-domain wavelet bases,” *IEEE Trans. Circuits Systems I*, pp. 2023-2032, Oct. 2005

R. Saleh, S. Wilton, S. Mirabbasi, A. Hu, M. Greenstreet, G. Lemieux, P. Pande, C. Grecu, and A. Ivanov, “System-on-chip: reuse and integration,” Proceedings of the IEEE

Z.S. Ebadi, S. Mirabbasi, and R. Saleh, “The application of complex quantized feedback in integrated wireless receivers,” *IEEE Trans Circuits Systems I*

S. Sheikhaei, S. Mirabbasi, and A. Ivanov, “A 0.18um CMOS pipelined encoder for a 5 GS/s 4-bit flash analogue-to-digital converter," *Canadian Journal of Electrical and Computer Engineering*, vol. 30, no. 4, pp. 183-187, Fall 2005

G. Ahn, D. Chang, M. Brown, N. Ozaki, H. Youra, K. Yamamura, K. Hamashita, K. Takasuka, G. Temes, and U. Moon, “A 0.6V 82dB delta-sigma audio ADC using switched-RC integrators," *IEEE J. Solid-State Circuits*, pp. 2398-2407, Dec. 2005

P. Hanumolu, G. Wei, and U. Moon, “Equalizers for high-speed serial links,” I*nt. J. High Speed Elec. Syst.*, vol. 15, no. 2, pp. 429-458, Jun. 2005

A. Pulincherry, M. Hufford, E. Naviasky, and U. Moon, “A time-delay jitter insensitive continuous-time bandpass delta-sigma modulator architecture,” *IEEE Trans. Circuits Syst. II*, pp. 680-684, Oct. 2005

G. Vemulapalli, P. Hanumolu, Y. Kook, and U. Moon, “A 0.8V, accurately tuned, linear continuous-time filter,” *IEEE J. Solid-State Circuits*, pp. 1972-1977, Sep. 2005

B. Greenley, R. Veith, D. Chang, and U. Moon, “A Low-Voltage 10-bit CMOS DAC in 0.01 mm^2 Die Area,” *IEEE Trans. Circuits Syst. II*, pp. 246-250, May 2005

V. Sharma, A. Narayanan, T. Rengachari, G. Temes, F. Chaplen, and U. Moon, “A low-cost, portable generic biotoxicity assay for environmental monitoring applications,” *Biosensors and Bioelectronics*, vol. 20/11, pp. 2218-2227, May 2005

J. Li, G. Ahn, D. Chang, and U. Moon, “A 0.9V 12mW 5MSPS algorithmic ADC with 77dB SFDR,” *IEEE J. Solid-State Circuits*, pp. 960-969, Apr. 2005

E. Artyomov, O. Yadid-Pecht, “Modified high-order neural network for invariant pattern recognition,” *Pattern Recognition Letters*, pp. 843-851, May 2005

E. Artyomov, Y. Rivenson, G. Levi, O. Yadid-Pecht, “Morton (Z) scan based real-time variable resolution CMOS image sensor”, *IEEE Trans. Circuits Syst. Video Technology*, pp. 947-952, Jul. 2005

A. Fish, A. Belenky and O. Yadid-Pecht, “Wide dynamic range snapshot APS for ultra low-power applications, *IEEE Trans. Circuits Syst. II*, pp. 729-733, Nov. 2005

A. Fish and O. Yadid-Pecht, “Bottleneck problem solution using biological models of attention in high resolution tracking sensors”, *Int. J. Information Theory Applications*, Dec. 2005

D. Grois, I. Shcherback, T. Danov, O. Yadid-Pecht, “Theoretical approach to CMOS APS PSF and MTF modeling-evaluation,” *IEEE Sensors journal*, Feb. 2006

K.S. Chong, B.H. Gwee, and J.S. Chang, “A 16-channel low power non-uniform spaced filter bank core for digital hearing aids,” *IEEE Trans. Circuits Syst. II*, 2006

B.H. Gwee, J.S. Chang and V. Adrian, “A micropower low distortion digital class D amplifier based on an algorithmic pulse width modulator,” *IEEE Trans. Circuits Syst. I*, vol. 52, no. 10, pp. 1-16, Oct. 2005

4. **Other professional recognitions**

2006 IEEE Gustav Robert Kirchhoff Award: Gabor Temes

Fulbright Fellowship Award: Ralph Etienne-Cummings

IEEE Distinguished Lecturer: Orly Yadid-Pecht

5. **2006-2007 planned activities**

ASPTC remains strongly committed to promote CAS interests in the ASP field, and assist with organizing and coordinating CASS-sponsored activities, such as ISCAS 2006. We will continue to seek close working relationships with other CASS technical committees in co-organizing events of inter-disciplinary nature, as we have done for special sessions and tutorials at ISCAS and MWSCAS in recent years. We will also maintain a broader influence in other societies such IEEE-CS and IEEE-SSCS. In 2006, ASPTC will renew the possibility of annual special issue, preferably in CAS-I or CAS-II, if not in other journals such as Analog Integrated Circuits and Signal Processing.

Un-Ku Moon, Chair
April 17, 2006