

Malcolm H. Smith
Managing Consultant
Cel +1 408 799 3236
Email: analogsmith@gmail.com

CMOS PA Expert and Cellular Front-end and Transceiver Architect; RF Systems and RFIC, Analog, and Mixed-signal Circuit Designer

Education

- 9/1988 – 7/1992 Ph.D. Electronic Engineering**
University of Kent at Canterbury, Canterbury, UK
Thesis: The Automated Design of CMOS Op-Amps
- 9/1986 – 9/1988 M.Sc. Digital Systems Design and Instrumentation**
University of Westminster, London, UK
- 10/1982 – 7/1985 B.Sc. (Hons) III Microelectronics**
University of Edinburgh, Edinburgh, UK

Experience

4/2014 - Present AnalogSmith Design Solutions LLC, San Jose, California, USA
Managing Consultant

Providing consultancy in the areas of CMOS PA, transceiver architecture, RF systems and RFIC, analog, and mixed-signal circuit design.

11/2012 - 3/2014 RFMD, San Jose, California, USA
Senior Manager Engineering

Lead development of 2.5G-3G TxM in CMOS:

- Achieved highest FOM (80 at 28dBm) for a Band I CMOS PA
- Drove aggressive shrink of 3G portion from 1.3mm² to 0.6mm²

1/2005 – 11/2012 Amalfi Semiconductor, Los Gatos, California, USA
Director of RF Systems, Director Analog Design, System Architect

Inventor of architecture and circuit for "Switchless GSM" TxM, (AM7826, AM7828 became RF7196, RF7196D, RF7198):

- Eliminate switch die saving costs and need to support second process
- Save a further 6c (approx. 20%) over previous CMOS TxM solution -- approx. \$6M annual profit on 100M run rate
- Primary reason for the RFMD purchase of Amalfi (\$47M)

Architecture and system design for 3G PA

- Customer visits to flesh out requirements
- Architecture design and specification
- Linearization system level simulation

Architecture and system design for the Amalfi AM8901 Polar EDGE CMOS PA

- Inventor of new circuit architecture for high PAE -- carried forward in all subsequent PAs

- Top level specification and preliminary block specification

Architecture and system design for the Amalfi AM8801 CMOS PA for GSM

- Specification of top level and all blocks
- Tier 1 customer visits, apps support, technical presentation and demo

Architecture and System development for an integrated EDGE polar PA and transceiver:

- Architecture and system design on a LIF receiver in CMOS (successful test chip)
- Top level architecture and RF system design of a polar EDGE/GMSK transmitter

2/2001 – 1/2005

Intel Corporation, Chandler, Arizona, USA

Senior Staff Analog Design Engineer, Radio Frequency Operation,

New Business Initiatives

Architecture and System:

- Chief architect in an internal startup, architecting cellular RFIC and analog front-ends for the near term to five years out
- Architect on an EDGE Chipset
- System engineer on a direct-down conversion SiGe BiCMOS RFIC solution for EDGE (first time success and Divisional Recognition Award)
- Architect and system engineer on a mixed-signal VLIF and DCR baseband (ADC through second down-conversion and digital filtering) in CMOS
- Architecture for an EDGE Tx and analog chip in CMOS
- Architect on UMTS chipset
- WCDMA Rx system design
- Up-conversion transmit simulation in MATLAB; Receive $\Sigma\Delta$ ADC modeling
- Worked with others on a business case for an analog front-end business and successfully sold it to management
- General technical consultant for the analog and RFIC groups

Circuit Design:

- LNA in SiGe BiCMOS for PDC (test chip) – NF = 0.9dB, Gain = 14dB, IIP3 = 11.8dBm measured
- Misc. circuits for EDGE down converter (small-signal buffer, power on reset circuit)

Adjunct Professor at Arizona State University

5/1996 – 1/2001

Lucent Technologies' Bell Labs, Allentown, PA, USA

Member of Technical Staff, Wireless, Microelectronics

RFIC:

- Lead engineer on a collaborative project to design a chip for IS-136/EDGE (3 synthesizers + Rx base-band)
- Experimental LNAs on 0.25um BiCMOS process

Wideband CDMA:

- Modeling of Tx mixed-signal path in MATLAB
- Design of Rx mixed signal channel for WCDMA analog base-band chip
- Design of AUX channels for WCDMA analog base-band chip

ADC for GSM Microcontroller:

- Design of analog components; synthesis of digital components from VHDL.

Analog Lead for POMP19 Super Chip (DSP, Memory, Analog):

- Design of ADC analog and synthesized digital
- Design of ESD scheme

Analog Lead on POMP15 Super Chip:

- Re-design of ADC analog with process port

10/1992 – 4/1996

Panasonic Electric Works Ltd., Osaka, Japan

Researcher, Semiconductor Research Laboratory

- Mixed-signal design for sensor products including design of switched-capacitor filters, continuous time filters, ADC, DAC, bandgap references etc.
- SRAM design
- CAD development

9/1988 – 9/1992

University of Kent at Canterbury, Canterbury, UK

Research Fellow, Electronics Laboratory

- Modeling of CMOS op-amps, and development of a program to size them in C
- Design of analog integrated circuits
- Development of a program to simulate Boolean neural networks in C

2/1986 – 9/1988

University of Westminster, London, UK

Research Officer, CMSA

- CAD program development in PASCAL
- Design of full custom DSP chips
- Design of analog cells for a cell library (M.Sc. project)

8/1985 – 2/1986

STC Semiconductors, Sidcup, Kent, UK

Graduate Design Engineer, Telecom and Semicustom Dept.

- Full custom design of telecommunications chips in NMOS
- Characterization of a cell library
- Measurement and parameter fitting of MOS devices

Skills

CMOS PA, Analog, Mixed-Signal, and RF IC Design;
Cellular Front-end and Transceiver Architecture Design;
Wireless RF & Mixed-Signal System Design;
IC CAD development: C, MATLAB, Perl, VHDL, and PASCAL

Languages

English – Native Speaker
Japanese – Near-Native Proficiency
German – Intermediate Level
French – Intermediate Level
Mandarin – Intermediate Level

Awards

Divisional Recognition Award Intel for first phone call with Intel's first cellular RFIC, Merit awards for outstanding UK academic staff in 1990, 1991, and 1992

Professional Affiliations

Senior Member IEEE, Member IET (UK)

Papers and Patents

11 papers and multiple patents listed separately

Contact Information

Malcolm Smith, Ph.D.

Cell +1 408 799 3236

Email: analogsmith@gmail.com

References: available on request