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Dr. Adam L. Schwartz

Profile

- Thirteen years experience in wireless communication systems, cellular infrastructure, RF design and semiconductor architecture as CTO, VP of Engineering and Principal Architect
- Proven ability to manage very complex projects across disciplines; track record of meeting design goals and delivering on schedule and within budget
- Unique combination of hands-on software and hardware experience plus system level expertise.
- RF architect and system integration project leader for one of only two fully-integrated UWB chipset solutions (RF, PHY, MAC) in the world.
- Primary inventor of twelve patents
- Designed multiple products from concept through production and bring-to-market
- Experience with CMs, ODMs; design for manufacture practices
- Business development, cash flow analysis and technical sales
- RF and wireless system simulation: Cadence (SpectreRF, VerilogA, ADE), ADS, spice
- Analysis tools: Matlab, Simulink, Stateflow, Excel w/ Visual Basic
- Schematic capture and RF/EMI board layout expert
- DSP, wireless modem design, embedded software (C and assembly)
- Automated test design and implementation
- Superb analytic and problem solving skills. Excellent communicator.

Professional Experience

July 2004 – Feb 2009	***TZero Technologies, Inc.***	*Sunnyvale, CA*

Fabless semiconductor manufacturer of Ultra-Wideband (UWB) chipsets capable of wireless data rates up to 480Mb/s. Product is recognized for superior range and performance. Listed in EDN magazine's "Hot Products of 2006". Twice named as an International CES Innovations 2007 Design and Engineering Awards Honoree. Best of RetailVision Award" Spring 2007 for New Technology. Highest CNET 2008 ranking for Wireless HDMI products.

Director System Integration and RF Architecture

- Responsible for software, ASIC, RF, hardware, MAC, PHY system integration.
- Achieved 95% RFIC yield, 98% board yield.
- Managing projects involving up to 20 engineers across multiple disciplines.
- Responsible for transforming prototypes into commercial products.
- Heading team to bring-up, debug and optimize reference designs.
- Successfully fought two patent infringement lawsuits brought against TZero.

Principal System Architect

- Architected and specified the CMOS 0.18um 3-5 GHz and 0.13um 3-10 GHz RF transceivers.
- Developed spreadsheet and Verilog-A behavioral models of the RF chip; measured results on first tape-out matched predicted performance with a high degree of accuracy.
- Developed system simulations in the Cadence analog design environment using RFDE.
- Contributed to development and debugging of self-calibration RTL/Verilog algorithms.
- Designed clock recovery algorithm for TZero's wireless HDMI product.
- Developed EVM test tool for OFDM UWB before such commercial tools exsited using Matlab, arbitrary waveform generators and high-speed sampling oscilloscopes. Critical for testing and debugging the RF transceiver and provided TZero a significant advantage over our competitors.
- Contributing author for WiMedia PHY specification and Compliance & Interop test specification.

May 2003 – June 2004   **MetroFi, Inc.**   *Mountain View, CA*

Deploy nationwide, residential wireless broadband access network. First employee.

Vice President, Hardware Engineering

- Instrumental in securing series-A financing.
- Developed cash flow models of network based on coverage and capacity analysis.
- Wrote the RFP defining physical and MAC layer requirements for the network hardware.
- Designed wireless broadband access architecture including RF coverage modeling, statistical throughput and latency analysis.
- Determined MetroFi's product offering.
- Hired and managed RF team. Built RF test lab.
- Managed relationships with hardware vendors. Responsible for hardware qualification.
- Determined deployment strategy including network optimization and analysis of impact of interference on capacity.
- Designed 5.8GHz OFDM bi-directional power amplifier; licensed the design to our vendors. Design is $1/10^{th}$ the cost and 20% more power efficient than anything available on the market.

May 1996 – Aug 2002   **LGC Wireless, Inc. (acquired by ADC)**   *San Jose, CA*

In-building cellular coverage systems: distributed antenna systems, pico-basestations, RF-over-fiber transport, RF repeaters. Helped start LGC with three colleagues. Company is currently over 200 employees with sales in 50+ countries to all of the world's major wireless operators.

Chief Technology Officer

- Set company's technical direction.
- Provided critical technical sales support for initial large deals in the UK and the United States.
- Built relationships with senior technical members at Vodafone, AT&T Wireless and Verizon crucial to the adoption of LGC technology.
- Managed and lead team of eighteen engineers and technicians.
- Identified and analyzed potential partnerships and M&A opportunities.
- Determined product strategy based on market, standards and economic trends. Assessed technical risks; identified design strategies to mitigate risks and maximize market opportunity.
- Developed in-building coverage and capacity analysis for voice and wireless data protocols including TDMA, GSM, iDEN, CDMA, W-CDMA, 1xRTT, 1xEV-DO, 802.11b and 802.11a.

Principal System Designer/Chief Scientist

- Responsibilities included raising venture capital financing, customer sales and support, manufacturing, recruiting, marketing and writing business proposals.
- Defined system architecture.
- Responsible for creating and defending intellectual property portfolio.
- RF design, schematic capture, PCB layouts and microcontroller programming. Design and numerical optimization of PLL loop filters, AGC loops, switching power supplies, power detectors, IF filters and matching networks.
- Created Excel Visual Basic tool-packs for RF and optical system cascade analysis.
- Wrote software for automated testing and pass/fail analysis.

June – Aug 1992   **Hughes Aircraft**   *El Segundo, CA*

- Modeling and nonlinear control design for a satellite attitude control system.

June – Aug 1990   **Lincoln Laboratories**   *Lincoln, MA*

- Rigid-body attitude control with on-off thrusters using time-optimal and PWM control.

June 1986 – Jan 1989   **IBM**   *San Jose, CA*

- Servo control and DSP assembly programming.

Education

1989 – 1996   ***University of California***   *Berkeley, CA*

Doctor of Philosophy in Electrical Engineering

- Optimization, numerical methods for optimal control, control theory—multivariable, robust, optimal, non-linear and adaptive control.
- Dissertation: *Theory and Implementation of Numerical Methods Based on Runge-Kutta Integration for Solving optimal Control Problems.*
- GPA: 4.0/4.0

1984 – 1989   ***Massachusetts Institute of Technology*** *Cambridge, MA*

MSEE, BSEE in Electrical Engineering

- Minor in economics
- GPA: 4.9/5.0
- Varsity crew oarsman. Voted *Most Inspirational Oarsman* by teammates.

Patents and Select Publications

Generating a Frequency Switching Local Oscillator Signal, patent pending.

Method and Apparatus for Determining and Indicating Direction of Sound, patent pending.

Bit Confidence Weighting Based on Levels of Interference, patent pending.

Average power control of wireless transmission having a variable duty cycle, patent pending.

Method for Reducing Image Spectral Leakage due to IQ Mismatch, patent pending.

Average EIRP Control of Multiple Antenna Transmission Signals, US patent 7,248,217.

Method and System for Distributing Multiband Wireless Communications Signals, US 6,801,767.

Centralized Channel Selection in a Distributed RF Antenna System, US patent 5,930,682.

Dynamic Sectorization in a CDMA Cellular System Employing Centralized Basestation Architecture, US Patent 6,353,600.

Fault Detection in a Frequency Duplexed System, US Patent 5,883,882.

Multi-Frequency Pilot Beacon for CDMA Systems, US Patent 6,556,551.

Adaptive Capacity Management in a Centralized Basestation Architecture, US Patent 6,594,496.

Random Offset Alarm Clock, US Patent 6,753,760.

Schwartz and Polak, "A Family of Projected Descent Methods for Optimization Problems with Simple Bounds," *Journal of Optimization Theory and Applications,* 92(1), Jan. 1997, pp. 1–32. **Referee comment: "The paper is very well written and fills the gap in the literature for algorithms for large-scale problems with simple bounds…"**

Schwartz and Polak, "Consistent Approximations for Optimal Control Problems Based on Runge-Kutta Integration," *Siam Journal Optim and Control,* 34(4), July 1996, pp. 1235–1269. **Editor's comment: "It is the consensus of the Associate Editor and the referees that this manuscript is a major contribution to the literature on numerical methods for optimal control."**

Awards, Achievements and Affiliations

Member, board of technical advisors for LGC Wireless, 2003–current.

DOD Fellowship ($16,000/yr), 1990–1992.

California Microelectronics Fellowship ($15,000), 1989–1990.

Co-winner of the $1,000 George C. Newton prize for best EECS lab design in 1987, MIT.

EECS 1 Lab instructor at UC Berkeley. Course instructor for *Signals and Systems* at UC Berkeley, 1989, 1993 and 1994. Twice nominated for Outstanding Graduate Student Instructor award.

Oarsman on the MIT lightweight men's crew team for four years (three years varsity).

UC Berkeley Boxing team, 1993–1994.