Jerry Twomey

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Position Desired: Design of medical devices or electronic products. Have designed new solutions for clinical problems, electro-mechanical systems, PCB electronics, and transistor level IC's. Experienced with: analog, mixed signal, RF, EMI, ESD, and signal integrity issues. Skills include: hands-on design, technical lead, staff mentoring, and management of many successful and profitable design projects.

Experience:

November 2003 – Present: **Effective Electrons,** San Diego California – Contract designer and OEM support services. This includes medical devices, electronic systems, and semiconductor design.

Medical Devices:

- Endoscope with 5 camera 360 degree video capture and adaptive image stitching between cameras
- Electro-stimulus pain relief device
- Wearable EEG system with Bluetooth link to cell phone
- Distributed robotics for automated laboratory sampling system
- Medical instrument used for HIV blood testing
- Therapeutic hypothermia induction for cardiac arrest scenarios
- Blood glucose devices, Personal use monitor, and Hospital Insulin IV pump controller w/monitor

All devices are IEC 60601-1 or IEC 61010 compliant, including failure management compliance/risk matrix, patient isolation safety, EMC compliance and functional redundancy. FDA submissions were done and granted.

Semiconductors and Electronic Systems:

- Wireless Power Charging Systems, High Power/Voltage, 300W/60V
- UWB receiver, 250 MHz BW, gmC filters and auto-calibration system, SiGe BiCMOS
- Radiation hardened PLL frequency synthesizer, 90nm SOI-CMOS
- SerDes transmitter/receiver, 20 GB/sec over copper, with adaptive transmitter-receivers 65nm CMOS
- ESD protection and I/O drivers, 6KV HBM, 90nm SOI-CMOS
- RF receiver signal processing (Matlab-Simulink system modeling)
- PCI Express transmitter, 45nm CMOS
- Micro-power crystal oscillator for wide process variance, 45nm CMOS
- LVDS Receiver/Transmitter, w/pre-emphasis, 90nm SOI-CMOS

Other Items:

- Author, technical design reference book, "Applied Embedded Electronics – Design Essentials for Robust Systems" O'Reilly Media
- Teaching industry and IEEE seminars: "Special Considerations in Medical Electronics"
- Teaching mixed signal IC design seminars

October 2002 – October 2003: **Axiom Microdevices**, Orange/Anaheim, California
CMOS RF Power Amplifiers for GSM cell phones. Series A start-up included IC design, layout, technical infrastructure, and staffing activities. This included:

- RF Front end driver circuits for PA
- PA linearity, phase noise analysis
- ESD I/O design
- PA Power management and control system
- Design team staffing, IT and EDA support
- Foundry/Process Qualification

September 2000 – August 2002: **IBM - RF Design Center,** Encinitas, California
Wireless IC Design: Development of direct conversion receivers for 3G cellular phones, WCDMA, GSM, UMTS, CDMA 2000 cellular standards. This included:

- Spur reduced PLL charge pump
- GSM gain, noise & linearity analysis
- Enhanced linearity LNA biasing
- Active RC filters and gmC filters
- WCDMA analog base-band
- Delta-Sigma ADC for CDMA 2000
- Auto-compensated process circuits
- New foundry processes: RF-CMOS & SiGe

July 1998 – September 2000: **Fairchild Semiconductor,** San Diego, California
Mixed signal IC design: designer and technical mentor for the department. Designs included:

- ADC's,14, 8 bit, VCO/counter & pipeline
- DAC, 10 bit, 300 MHz, I-steering
- Thermal cooling monitor/control IC
- LDO micro-power, 35 uA, for cellular
- PLL, 300MHz, for clock recovery
- Product demonstration/test PCB design
- Li-ion battery protection & charger IC
- Power systems, batteries & chargers

February 1996 - June 1998: **LSI Logic - Mixed Signal Design Group,** Milpitas, California
CMOS Mixed Signal IC Design: Done for a standard product cell library.
Designs included:

- PLL, 300MHz & 1GHz CDR & Freq. Synth.
- DVD timing recovery & controller
- DAC, 10 bit, current steering
- ADC's, 6 bit flash & 10 bit, sub-ranging
- CMOS foundry/process development
- Band-gap & Process calibration circuits

Academic & Professional:

- UCSD ECE graduate studies, lecturer, 2010, ECE-264C, ADC and DAC IC Design
- Stanford University, invited speaker, Rethinking Analog Design - Simulation vs. Silicon, May 2010,
- Chairman 2005 - 2011 IEEE San Diego – Solid State Circuits, Microwave Theory and Techniques
- IEEE JSSC & IEEE MTT, Journal Reviewer, 2003 - 2010
- UCSD Extension, Instructor, "CMOS Analog and Mixed Signal IC Design" 1999 - 2002
- IEEE Senior Member, San Diego IEEE Executive Committee, Silicon Valley Consultants Group

Publications:

- "Applied Embedded Electronics – Design Essentials for Robust Systems" (book), November 2023, 560 pages, ISBN-13: 978-1098144791, Publisher: O'Reilly Media
- "The Essentials of AC Power Safety" Electronic Design Magazine (ED), 2/8/2017
- "Wireless-Power Devices: Solutions Beyond Cell Phones" ED, 3/19/2015
- "Twisted Forms of Internet Reality and the Engineering Skeptic" ED, 10/23/2014
- "Factor Time And Money Before Using A Simulator" ED, 5/2/2014
- "Safeguard Your Intellectual Property" ED, 2/28/2014
- "Know Your Regulations Before You Design Medical Electronics" ED, 11/11/2013
- "Technology Resumes That Get Jobs" ED, 2/19/2013
- "Quiet Down To Meet FCC Emissions Standards" ED, 7/10/2013
- "Marketing And Technology Collide In Competitive Chip Design" ED, 10/11/2012
- "Protect Your Fortress From ESD" ED, 8/9/2012
- "Academic Simplifications Produce Meaningless Equations" ED, 6/13/2012
- "Simple Grounding Rules Yield Huge Rewards" ED, 4/27/2012
- "Tiny Transistors! Giant Molecules! Moore's Law Crashes Into The Laws of Physics" ED, 4/9/2012
- "Efficient Simulation and Validation for Mixed-Signal SOCs" EDN Magazine (EDN), 3/29/2007
- "Determine Foundry-Model Problems Without Touching a Wafer" Chip Design Magazine April-May 2006
- "Simulation Vs. Silicon – Avoid Costly Mistakes With Accurate Models" ED, 10/28/2004
- "Signal Integrity Effects in Custom IC and ASIC Designs, Book, multi-author, 2002, ISBN 0-471-15042-8
- "BiCMOS 5HPE A New Si-Ge Technology for HF & RF Apps." IBM Micro News, Vol. 7, No. 4, 2001
- "Designing Analog and Mixed Signal Circuits on Digital CMOS Processes" EDN, 8/3/2000
- "Noise Reduction Is Crucial to Mixed-Signal Design Success " ED, 10/30/2000, 12/4/2000

Patents: USPTO-7,974,052 & 8,654,489: Method and Apparatus For Switched ESD Protection, USPTO-7,256,573: Distributed Active Transformer Power Control Techniques, USPTO-7,043,206: Fully Integrated Offset Compensation Feedback Circuit, USPTO – 7,027,791: Analog Baseband Signal Processing and Method, USPTO – 6,657,494: Variable Gain Mixer Amplifier with Fixed DC Operating Voltage Level

Design Tools: Cadence, Analog Artist, Spectre, Spectre-RF, Virtuosso-XL, OCEAN Scripts, SPICE, HSPICE Mentor Graphics, Design Architect, Accusim, Calibre, Viewlogic, Verilog-AMS, Verilog-A**,** Orcad, Altium Designer, Mentor-PADS ASITIC, Sonnet **,** Matlab, Simulink, Agilent ADS, LabView**,** Verilog, Xilinx IDE, AtmelIDE.

Education: MSEE & BSEE - Worcester Polytechnic Institute, Worcester MA