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**R. JACOB (JAKE) BAKER, PH.D., P.E.**

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## EDUCATION

Ph.D. in Electrical Engineering; December 1993; University of Nevada, Reno, GPA 4.0/4.0. Dissertation Title: *Applying power MOSFETs to the design of electronic and electro-optic instrumentation.*

M.S. and B.S. in Electrical Engineering: May 1986 and May 1988; University of Nevada, Las Vegas. Thesis Title: *Three-dimensional simulation of a MOSFET including the effects of gate oxide charge.*

## ACADEMIC EXPERIENCE

**January 1991 - Present:** Professor of Electrical and Computer Engineering at the **University of Nevada, Las Vegas** from August 2012 to present. From January 2000 to July 2012 held various positions at **Boise State University** including: Professor (2003 – 2012), Department Chair (2004 - 2007), and tenured Associate Professor (2000 - 2003). From August 1993 to January 2000 was a tenured/tenure track faculty member at the **University of Idaho**: Assistant Professor (1993 - 1998) and then tenured Associate Professor (1998 - 2000). Lastly, from January 1991 to May 1993 held adjunct faculty positions in the departments of Electrical Engineering at the University of Nevada, Las Vegas and Reno. Additional details:

- Research is focused on analog and mixed-signal integrated circuit fabrication and design. Worked with multi-disciplinary teams (civil engineering, biology, materials science, etc.) on projects that have been funded by EPA, DARPA, NASA, Army, DMEA, and the AFRL.
- Current and past research and development interests are:
  - Capacitive sensing techniques using delta-sigma modulation and interfacing to sensors
  - Circuit design and fabrication for the control, use, and storage of renewable energy using thermoelectric generators
  - Design of electrical/biological/optical circuits and systems using electrowetting on dielectric for automating and controlling biological experiments
  - Design of readout integrated circuits (ROICs) for use with focal plane arrays (FPAs)
  - Heterogeneous integration of III-V photonic devices (e.g. FPAs and VCSELs) with CMOS
  - Methods (e.g., 3D packaging and capacitive interconnects) to reduce power consumption in semiconductor memories, memory modules, and digital systems using custom and non-custom (e.g., FPGAs) implementations
  - Analog and mixed-signal circuit fabrication and design for communication systems, synchronization, energy storage, data conversion, and interfaces

- The design of writing and sensing circuitry for emerging nonvolatile memory technologies, focal planes, and displays (arrays) in nascent nanotechnologies (e.g. magnetic, chalcogenide)
- Reconfigurable electronics design and fabrication using nascent memory technologies such as the memristor to implement FPGAs
- Finding an electronic, that is, no mechanical component, replacement for the hard disk drive using nascent fabrication technologies
- Power electronics circuit design for consumers and consumer electronics including power management and adaptive control to reduce power consumption
- Design of bandpass delta-sigma modulators for IQ demodulation in wireless communication systems
- University prototyping, fabricating, and packaging of integrated circuits
- Led, as chair, the department in graduate curriculum (MS and PhD), program development, and ABET accreditation visits.
- Worked with established and start-up companies to provide technical expertise and identify employment opportunities for students.
- Held various leadership and service positions including: ECE chair, graduate coordinator, college curriculum committee (chair), promotion and tenure committee, scholarly activities committee, faculty search committee, university level search committees, etc. Collaborate with College of Engineering faculty on joint research projects.
- Taught courses in circuits, analog IC design, digital VLSI design and fabrication, and mixed-signal integrated circuit design to both on- and, via the Internet, off-campus students. Research emphasis in integrated circuit design using nascent technologies.

## INDUSTRIAL EXPERIENCE

**2013 - present:** Working with Freedom Photonics on the integration, fabrication and design, of optoelectronics with CMOS integrated circuits. Work includes the design of compact optical transceivers for range finding applications, high-efficiency integrated silicon avalanche photodetectors for quantum key receivers, Geiger mode SiGe receivers for long-range communications, cryptography, and the fabrication of near-infrared focal plane arrays. Packaging and testing of numerous chips fabricated in both CMOS and SiGe technologies.

**2017 - 2019:** Worked with Vorpil Research Systems, Las Vegas, NV on the design of integrated circuit electronics and optoelectronics for optical transceivers used in LIDARs/LADARs.

**2016 - 2019:** Worked with Attollo Engineering on the design of transient digitizers for the capture of high-speed signals for range finders using LEDs and lasers in compact optical transceivers.

**2013 - 2018:** Working with Mission Support and Test Services, LLC (MSTS, formerly National Security Technologies, LLC, [NSTec]) on the Design and Fabrication of Integrated electrical/photonic application specific integrated circuit (ASIC) design for use in the implementation of diagnostic instrumentation.

**2013 - 2015:** Consultant for OmniVision. Working on integrating CMOS image sensors (CIS) with memory for very high-speed consumer imager products. Design specialty DRAM, high-speed interfaces between CIS and DRAM, packaging techniques to pair the CIS with DRAM.

**2010 - 2013:** Worked with Arete' Associates on the design of high-speed compressive transimpedance amplifiers for LADAR projects and the design of ROIC unit cells. Work funded by the U. S. Air Force.

**2013:** Cirque, Inc. Consulting on the design of analog-to-digital interfaces for capacitive touch displays and pads.

**2012:** Consultant at Lockheed-Martin Santa Barbara Focal Plane Array. CMOS circuit design and fabrication for the development and manufacture of infrared components and imaging systems with

an emphasis on highest sensitivity Indium Antimonide (InSb) focal plane arrays (FPAs) in linear through large staring formats. Product groups include FPAs, integrated dewar assemblies (IDCAs), camera heads, high-speed interfaces between image processors and imaging systems, and infrared imaging systems.

**2010 - 2012:** Working with Aerius Photonics (and then FLIR Inc. when Aerius was purchase by FLIR) on the design of Focal Plane Arrays funded (SBIRs and STTRs) by the U.S. Air Force, Navy, and Army. Experience with readout integrated circuits (ROICs) and the design/layout of photodetectors in standard CMOS.

**2009 - 2010:** Sun Microsystems, Inc. (now Oracle) VLSI research group. Provided consulting on memory circuit design/fabrication and proximity connection (PxC) interfaces to DRAMs and SRAMs for lower power, 3D packaging, for memory modules and controllers implemented with FPGAs and custom ASICs.

**2009 - 2010:** Contour Semiconductor, Inc. Design of NMOS voltage and current references as well as the design of a charge pump for an NMOS memory chip.

**1994 - 2008:** Affiliate faculty (Senior Designer), Micron Technology. Designed CMOS circuits for DRAMs including DLLs, PLLs for embedded graphics chips, voltage references and regulators, data converters, field-emitting display drivers, sensing for MRAM (using delta-sigma data conversion topologies), SRAMs, CMOS active pixel imagers and sensors, power supply design (linear and switching), input buffers, etc. Worked on a joint research project between Micron and HP labs in magnetic memory fabrication and design using the MTJ memory cell. Worked on numerous projects (too many to list) resulting in numerous US patents (see following list). Considerable experience working with product engineering to ensure high-yield from the production line from fabrication to test. Co-authored a book on DRAM circuit design through the support of Micron. Gained knowledge in the entire memory design process from fabrication to packaging. Developed, designed, and tested circuit design techniques for multi-level cell (MLC) Flash memory using signal processing.

**January 2008:** Consultant for Nascentric located in Austin, TX. Provide directions on circuit operation (DRAM, memory, and mixed-signal) for fast SPICE circuit simulations.

**May 1997 - May 1999:** Consultant for Tower Semiconductor, Haifa, Israel. Designed CMOS integrated circuit cells for various modem chips, interfaces, and serial buses including USB circuits, charging circuits based upon power up/down circuits using an MOS or bandgap reference, pre-amplifiers, comparators, etc.

**Summer 1998:** Consultant for Amkor Wafer Fabrication Services, Micron Technology, and Rendition, Inc., Design PLLs and DLLs for custom ASICs and a graphics controller chip.

**Summers 1994 - 1995:** Micron Display Inc. Designing phase locked loop for generating a pixel clock for field emitting displays and a NTSC to RGB circuit on chip in NMOS. These displays are miniature color displays for camcorder and wrist watch size color television. Worked on the fabrication and design of video peripheral circuits for these displays.

**September - October 1993:** Lawrence Berkeley Laboratory. Designed and constructed a 40 A, 2 kV power MOSFET pulse generator with a 3 ns rise-time and 8 ns fall-time for driving Helmholtz coils.

**Summer 1993:** Lawrence Livermore National Laboratory, Nova Laser Program. Researched picosecond instrumentation, including time-domain design for impulse radar and imaging.

**December 1985 - June 1993:** (from July 1992 to June 1993 employed as a consultant while finishing up my Ph.D.), E.G.&G. Energy Measurements Inc., Nevada, Senior Electronics Design Engineer. Responsible for the design and manufacturing of instrumentation used in support of Lawrence Livermore National Laboratory's Nuclear Test Program. Responsible for designing and fabricating over 30 electronic and electro-optic instruments including: CCD camera design, fiber optic

transmitters employing high speed laser drive electronics, receivers employing envelop tracking for DC voltage restoration and regeneration of received information, receiver low noise amplifier design, frame synchronizers for re-assembling transmitted images, high-speed SRAM memory system design with battery back-up, calibration equipment design such as a tunnel diode pulse generator for testing compensation of oscilloscopes and DAC design for calibrating CCD readout electronics, power supply and battery charger designs, sweep circuits for streak cameras, Pockel's cell drive electronics, vertical amplifier design using HBTs for analog oscilloscopes used at the Nevada Test Site, and 10 kV ramp designs using a planar triode to name some of the designs.

This position provided considerable fundamental grounding in EE with a broad exposure to PC board design to the design of cable equalizers. Summarizing, I gained experience in circuit design technologies including: bipolar, vacuum tubes (planar triodes for high voltages), hybrid integrated circuit fabrication and design, GaAs (high speed logic and HBTs), krytrons, power MOSFETs, microwave techniques, fiber optic transmitters/receivers, etc.

**Summer 1985:** Reynolds Electrical Engineering Company, Las Vegas, Nevada. Gained hands on experience in primary and secondary power system design, installation and trouble-shooting electric motors on mining equipment.

## **MEMBERSHIPS IN PROFESSIONAL AND SCHOLARLY ORGANIZATIONS**

IEEE (student, 1983; member, 1988; senior member, 1997; Fellow, 2013)

Member of the honor societies Eta Kappa Nu and Tau Beta Pi

Licensed Professional Engineer

## **HONORS AND AWARDS**

- Consolidated Students of the University of Nevada, Las Vegas (CSUN) Faculty Award, 2017
- Tau Beta Pi UNLV Outstanding Professor of the Year in 2013, 2014, 2015 and 2016
- UNLV ECE Department Distinguished Professor of the Year in 2015
- IEEE Fellow for contributions to the design of memory circuits - 2013
- Distinguished Lecturer for the IEEE Solid-State Circuits Society, 2012 - 2015
- IEEE Circuits and Systems (CAS) Education Award - 2011
- Twice elected to the Administrative Committee of the Solid-State Circuits Society, 2011 - 2016
- Frederick Emmons Terman Award from the American Society of Engineering Education - 2007
- President's Research and Scholarship Award, Boise State University - 2005
- Honored Faculty Member - Boise State University Top Ten Scholar/Alumni Association 2003
- Outstanding Department of Electrical Engineering faculty, Boise State 2001
- Recipient of the IEEE Power Electronics Society's Best Paper Award in 2000
- University of Idaho, Department of Electrical Engineering outstanding researcher award, 1998-99
- University of Idaho, College of Engineering Outstanding Young Faculty award, 1996-97

## **SERVICE**

Reviewer for IEEE transactions on solid-state circuits, circuits and devices magazine, education, instrumentation, nanotechnology, VLSI, etc. Reviewer for several American Institute of Physics journals as well (Review of Scientific Instruments, Applied Physics letters, etc.) Board member of the IEEE press (reviewed dozens of books and book proposals). Reviewer for the National Institutes of Health. Technology editor and then Editor-in-Chief for the Solid-State Circuits Magazine.

Led the Department on ABET visits, curriculum and policy development, and new program development including the PhD in electrical and computer engineering. Provided significant University and College service in infrastructure development, Dean searches, VP searches, and growth of academic programs. Provided university/industry interactions including starting the ECE department's advisory

board. Held positions as the ECE department Masters graduate coordinator and coordinator for the Sophomore Outcomes Assessment Test (SOAT).

Also currently serves, or has served, on the IEEE Press Editorial Board (1999-2004), as a member of the first Academic Committee of the State Key Laboratory of Analog and Mixed-Signal VLSI at the University of Macau, as editor for the Wiley-IEEE Press Book Series on Microelectronic Systems (2010-2018), on the IEEE Solid-State Circuits Society (SSCS) Administrative Committee (2011-2016), as an Advisory Professor to the School of Electronic and Information Engineering at Beijing Jiaotong University, as a Distinguished Lecturer for the SSCS (2012-2015), as the Technical Program Chair for the IEEE 58<sup>th</sup> 2015 International Midwest Symposium on Circuits and Systems, MWSCAS 2015, as advisor for the student branch of the IEEE at UNLV (2013-present), and as the Technology Editor (2012-2014) and Editor-in-Chief (2015-2020) for the *IEEE Solid-State Circuits Magazine*.

#### **ARMED FORCES**

6 years United States Marine Corps reserves (Fox Company, 2nd Battalion, 23rd Marines, 4th Marine Division), Honorable Discharge, October 23, 1987. Military Occupational Specialty was Machine Gunner (MOS 0331)

#### **TEXTBOOKS AUTHORED**

Baker, R. J., "CMOS Circuit Design, Layout and Simulation, Fourth Edition" *Wiley-IEEE Press*, 1234 pages. ISBN 9781119481515 (2019) **Over 50,000 copies of this book in print.** (Third Edition published in 2010, Revised Second Edition published in 2008, and Second Edition Published in 2005)

Baker, R. J., "CMOS Mixed-Signal Circuit Design," *Wiley-IEEE*, 329 pages. ISBN 978-0470290262 (second edition, 2009) and ISBN 9780471227540 (First Edition published in 2002)

Keeth, B., Baker, R. J., Johnson, B., and Lin, F., "DRAM Circuit Design: Fundamental and High-Speed Topics", *Wiley-IEEE*, 2008, 201 pages. ISBN: 9780470184752

Keeth, B. and Baker, R. J., "DRAM Circuit Design: A Tutorial", *Wiley-IEEE*, 2001, 201 pages. ISBN 0780360141

Baker, R. J., Li, H.W., and Boyce, D.E. "CMOS Circuit Design, Layout and Simulation," *Wiley-IEEE*, 1998, 904 pages. ISBN 9780780334168

#### **BOOKS, OTHER (edited, chapters, etc.)**

Saxena, V. and Baker, R. J., "Analog and Digital VLSI," chapter in the CRC Handbook on Industrial Electronics, edited by J. D. Irwin and B. D. Wilamowski, *CRC Press*, 2009 second edition.

Baker, R. J., "CMOS Analog Circuit Design," (A self-study course with study guide, videos, and tests.) IEEE Education Activity Department, 2000. ISBN 0-7803-4822-2 (with textbook) and ISBN 0-7803-4823-0 (without textbook)

Baker, R. J., "CMOS Digital Circuit Design," (A self-study course with study guide, videos, and tests.) *IEEE Education Activity Department*, 2000. ISBN 0-7803-4812-5 (with textbook) and ISBN 0-7803-4813-3 (without textbook)

Li, H.W., Baker, R. J., and Thelen, D., "CMOS Amplifier Design," chapter 19 in the CRC VLSI Handbook, edited by Wai-kai Chen, *CRC Press*, 1999 (ISBN 0-8493-8593-8) and the second edition in 2007 (ISBN 978-0-8493-4199-1)

#### **INVITED TALKS AND SEMINARS**

Have given over 50 invited talks and seminars at the following locations: AMD (Fort Collins), AMI semiconductor, Arizona State University, Beijing Jiaotong University, Boise State University, Carleton University, Carnegie Mellon, Columbia University, Dublin City University (Ireland), E.G.&G. Energy

Measurements, Foveon, the Franklin Institute, Georgia Tech, Gonzaga University, Hong Kong University of Science and Technology, ICySSS keynote, IEEE Computing and Communication Workshop (CCWC), IEEE Electron Devices Conference (NVMETS), IEEE Workshop on Microelectronics and Electron Devices (WMED), Indian Institute of Science (Bangalore, India), Instituto de Informatica (Brazil), Instituto Tecnológico y de Estudios Superiores de Monterrey (ITESM, Mexico), Iowa State University, Lawrence Livermore National Laboratory, Lehigh University, Lockheed-Martin, Micron Technology, Nascentric, National Semiconductor, Princeton University, Rendition, Saintgits College (Kerala, India), Southern Methodist University, Sun Microsystems, Stanford University, ST Microelectronics (Delhi, India), Temple University, Texas A&M University, Tower Semiconductor (Israel), University of Alabama (Tuscaloosa), University of Arkansas, University of Buenos Aires (Argentina), University of Houston, University of Idaho, University of Illinois (Urbana-Champaign), Université Laval (Québec City, Québec), University of Macau, University of Maryland, Université de Montréal (École Polytechnique de Montréal), Xilinx (Ireland), University of Nevada (Las Vegas), University of Nevada (Reno), University of Toronto, University of Utah, Utah State University, and Yonsei University (Seoul, South Korea).

### **RECENT RESEARCH FUNDING (LAST 5 YEARS)**

Recent funding listed below. In-kind, equipment, and other non-contract/grant funding [e.g., MOSIS support, money for travel for invited talks, etc.] not listed.

- Baker, R. Jacob, (2019-2021) "Tiled Silicon Photomultiplier Array Read-Out Integrated Circuit," NASA, \$225,238
- Baker, R. Jacob, (2019-2021) "Dual-Mode, Extended Near-Infrared, Focal Plane Arrays Fabricated with CMOS Compatible GeSiSn Alloy Materials," DARPA, \$149,998
- Baker, R. Jacob, (2018-2020) "Geiger Mode SiGe Receiver for Long-Range Optical Communications," NASA, \$99,996
- Baker, R. Jacob, (2019) "Improved Quantum Efficiency Photo-Detector," Navy, \$29,999
- Baker, R. Jacob, (2018-2019) "Tiled Silicon Photomultiplier Array Read-Out Integrated Circuit – Phase I," NASA, \$29,999
- Baker, R. Jacob, (2017-2019) "Quantum Cryptography Detector Chip," Defense MicroElectronics Activity (DMEA), \$266,029
- Baker, R. Jacob, (2017-2019) "Advanced Printed Circuit Board Design Methods for Compact Optical Transceiver," U.S. Army/DOD, \$299,605
- Baker, R. Jacob, (2016-2018) "High-Sensitivity Monolithic Silicon APD and ROIC," U.S. Air Force/DOD, \$299,665
- Baker, R. Jacob, (2017-2018) "Transimpedance Amplifier Integrated Circuit Collaboration," Department of Energy, National Security Technologies, LLC, \$100,436
- Baker, R. Jacob, (2017) "Geiger Mode SiGe Receiver for Long-Range Optical Communications," NASA, \$30,000
- Baker, R. Jacob, (2016-2017) "Testing and development of BiCMOS photodetectors and diagnostic instrumentation," Department of Energy, National Security Technologies, LLC, \$181,605
- Baker, R. Jacob, (2016-2017) "Dual-Mode, Extended Near Infrared, Focal Plane Arrays fabricated with a Commercial SiGe BiCMOS Process," DARPA, \$41,892

### **DOCTORAL STUDENT SUPERVISION**

9. Wenlan Wu – High-Speed Radhard Mega-Pixel CIS Camera for High-Energy Physics (2019)
8. Kostas Moutafis – A Highly-Sensitive Global-Shutter CMOS Image Sensor with On-Chip Memory for Hundreds of kilo-frames per second Scientific Experiments (2019)
7. Yiyang Li – Portable High Throughput Digital Microfluidics and On-Chip Bacteria Cultures (2016)



6. Yacouba Moumouni – Designing, Building, and Testing a Solar Thermoelectric Generation, STEG, for Energy Delivery to Remote Residential Areas in Developing Regions (2015)
5. Qawi IbnZayd Harvard – Low-Power, High-Bandwidth, and Ultra-Small Memory Module Design (2011)
4. Vishal Saxena – K-Delta-1-Sigma Modulators for Wideband Analog-to-Digital Conversion (2010)
3. Robert Russell Hay – Digitally-Tunable Surface Acoustic Wave Resonator (2009)
2. Xiangli Li (the first Boise State University College of Engineering PhD graduate) – MOSFET Modulated Dual Conversion Gain CMOS Image Sensors (2008)
1. Feng Lin, Research and Design of Low Jitter, Wide Locking-Range Phase-Locked and Delay-Locked Loops (2000)

## **MASTERS STUDENT SUPERVISION**

79. Jonathan DeBoy (2018)
78. Dane Gentry – Design, Layout, and Testing of SiGe APDs Fabricated in a BiCMOS Process (2018)
77. James Mellot – Variable Transition Time Inverters in a Digital Delay Line with Analog Storage for Processing Fast Signals and Pulses (2018)
76. Eric Monahan – High Speed Fast Transient Digitizer Design and Simulation (2018)
75. Shada Sharif – Design and Analysis of First and Second Order K-Delta-1-Sigma Modulators in Multiple Fabrication Processes (2018)
74. Vikas Vinayaka – Analysis and Design of Analog Front-End Circuitry for Avalanche Photodiodes (APD) and Silicon Photo-Multipliers (SiPM) in Time-of-Flight Applications (2018)
73. Claire Tsagkari – Design, Fabrication and Testing of a Capacitive Sensor Using Delta-Sigma Modulation (2017)
72. Kevin Buck – Fast Transient Digitizer and PCB Interface (2015)
71. Marzieh Sharbat Maleki (2015)
70. Angsuman Roy – Design, Fabrication and Testing of Monolithic Low-Power Passive Sigma-Delta Analog-to-Digital Converters (2015)
69. Daniel Anderson – Design and Implementation of an Instruction Set Architecture and Instruction Execution Unit for the RZ9 Coprocessor System (2014)
68. Jared Gordon – Design and Fabrication of an Infrared Optical Pyrometer ASIC (2013)
67. Justin Butterfield (2012)
66. Adam Johnson – Methods and Considerations for Testing Resistive Memories (2012)
65. Ben Millemon – CMOS Characterization, Modeling, and Circuit Design in the Presence of Random Local Variation (2012)
64. Justin Wood (2012)
63. Chamunda Ndinawe Chamunda (2011)
62. Gary VanAckern – Design Guide for CMOS Process On-Chip 3D Inductors using Thru-Wafer Vias (2011)
61. Lucien Jan Bissey – High-Voltage Programmable Delta-Sigma Modulation Voltage-Control Circuit (2010)
60. Kaijun Li (2010)
59. Yingting Li (co-supervised with Maria Mitkova) (2010)
58. Lael Matthews (co-supervised with Said Ahmed-Zaid) (2010)
57. Priyanka Mukeshbhai Parikh (2010)
56. Todd Plum (co-supervised with Jeff Jessing) – Design and Fabrication of a Chemicapacitive Sensor for the Detection of Volatile Organic Compounds (2010)
55. Rahul Srikonda (2010)
54. Avani Falgun Trivedi (2010)

53. Kuang Ming Yap – Gain and Offset Error Correction for CMOS Image Sensors using Delta-Sigma Modulation (2010)
52. Mahesh Balasubramanian – Phase Change Memory - Array Development and Sensing Circuits using Delta-Sigma Modulation (2009)
51. Lincoln Bollschweiler (2009)
50. Shantanu Gupta (2009)
49. Qawi Harvard – Wide I\_O DRAM Architecture Utilizing Proximity Communication (2009)
48. Avinash Rajagiri (2009)
47. Ramya Ramarapu (2009)
46. Harikrishna Rapole (2009)
45. Aruna Vadla (2009)
44. Hemanth Ande (2008)
43. Curtis Cahoon – Low-Voltage CMOS Temperature Sensor Design using Schottky Diode-Based References (2008)
42. Prashanth Busa (2008)
41. John McCoy III (2008)
40. Dennis Montierth – Using Delta-Sigma-Modulation for Sensing in a CMOS Imager (2008)
39. Rudi Rashwand (2008)
38. Barsha Shrestha (co-supervised with Zhu Han) – Wireless Access in Vehicular Environments using Bit Torrent and Bargaining (2008)
37. Eric Becker – Design of an Integrated Half-Cycle Delay Line Duty Cycle Corrector Delay Locked Loop (2007)
36. Matthew Leslie – Noise-Shaping Sense Amplifier for Cross-Point Arrays (2007)
35. Jose Monje (2007)
34. Sanghyun Park (2007)
33. Vishal Saxena – Indirect Feedback Compensation Techniques for Multi-Stage Operational Amplifiers (2007)
32. Meshack Appikarla (2006)
31. Eric Booth – Wide Range, Low Jitter Delay-Locked Loop Using a Graduated Digital Delay Line and Phase Interpolator (2006)
30. Sucheta Das (2006)
29. Krishna Duvvada – High Speed Digital CMOS Input Buffer Design (2006)
28. Krishnamraju Kurra (2006)
27. Soumya Narasimhan (2006)
26. Roger Porter (2006)
25. David Butler – Low-Voltage Bandgap Reference Design Utilizing Schottky Diodes (2005)
24. Dragos Dimitriu (2005)
23. Surendranath Eruvuru – Sensing Circuit Design for an Ion Mobility Spectrometer (2005)
22. Sandhya Sandireddy (2005)
21. Harish Singidi (2005)
20. Indira Vemula – Delta-Sigma Modulator Used in CMOS Imagers (2005)
19. Bhavana Kollimarla – A 1-Bit Analog-to-Digital Converter Using Delta Sigma Modulation for Sensing in CMOS Imagers (2004)
18. Sandeep Pemmaraju – High Voltage Charge Pump Circuit for an Ion Mobility Spectrometer (2004)
17. Ravindra Puthumbaka – Circuit Design for an Ion Mobility Spectrometer (2004)
16. Brandon Roth – Comparison of Asynchronous vs. Synchronous Design Technologies using a 16-bit Binary Adder (2004)
15. Jennifer Taylor – Reading and Writing Flash Memory Using Delta-Sigma Modulation (2004)
14. Jing Plaisted – Methods for Memory Testing (2003)



13. Murugesh Subramaniam – Flash Memory Sensing Using Averaging (2003)
12. Brian Johnson – Application of an Asynchronous FIFO in a DRAM Data Path (2002)
11. Scott Ward – Electrostatic Discharge (ESD) Protection in CMOS (2002)
10. Tyler Gomm – Design of a Delay-Locked Loop with a DAC-Controlled Analog Delay Line (2001)
9. Gexin Huang (2001)
8. Chris Atkins (2000)
7. Thaddeus Black (2000)
6. Zuxu Qin (2000)
5. Hao Chen (1999)
4. Doug Hackler (co-supervised with Steve Parke) – TMOS: A Novel Design for MOSFET Technology (1999)
3. Song Liu – Design of a CMOS 6-bit Folding and Interpolating Analog-to-Digital Converter (1999)
2. Ben Ba (1997)
1. Brent Keeth – A Novel Architecture for Advanced High Density Dynamic Random Access Memories (1996)

## GRANTED US PATENTS

151. Baker, R. J., "Quantizing circuits having improved sensing," **10,403,339**, September 3, 2019.
150. Baker, R. J., "Digital Filters with Memory," **10,366,744**, July 30, 2019.
149. Baker, R. J., "Quantizing circuits having improved sensing," **10,127,954**, November 13, 2018.
148. Baker, R. J. and Parkinson, W., "NMOS regulated voltage reference," **9,753,481**, September 5, 2017.
147. Baker, R. J., "Digital Filters with Memory," **9,734,894**, August 15, 2017.
146. Baker, R. J. and Keeth, B., "Optical interconnect in high-speed memory systems," **9,697,883**, July 7, 2017
145. Baker, R. J., "Comparators for delta-sigma modulators," **9,641,193**, May 2, 2017.
144. Baker, R. J., "Quantizing circuits having improved sensing," **9,449,664**, September 20, 2016.
143. Baker, R. J., "Error detection for multi-bit memory," **9,336,084**, May 10, 2016.
142. Baker, R. J. and Keeth, B., "Optical interconnect in high-speed memory systems," **9,299,423**, March 29, 2016.
141. Baker, R. J., "Methods for sensing memory elements in semiconductor devices," **9,299,405**, March 29, 2016.
140. Baker, R. J., "Comparators for delta-sigma modulators," **9,135,962**, September 15, 2015.
139. Baker, R. J., "Resistive memory element sensing using averaging," **9,081,042**, July 14, 2015.
138. Baker, R. J., "Digital Filters with Memory," **9,070,469**, June 30, 2015.
137. Baker, R. J., "Reference current sources," **8,879,327**, November 4, 2014.
136. Baker, R. J. and Beigel, K. D., "Multi-resistive integrated circuit memory," **8,878,274**, November 4, 2014.
135. Baker, R. J., "Methods for sensing memory elements in semiconductor devices," **8,854,899**, October 7, 2014.
134. Baker, R. J., "Quantizing circuits with variable parameters," **8,830,105**, September 9, 2014.
133. Baker, R. J., "Integrators for delta-sigma modulators," **8,754,795**, June 17, 2014.
132. Baker, R. J., "Methods of quantizing signals using variable reference signals," **8,717,220**, May 6, 2014.
131. Baker, R. J. and Keeth, B., "Optical interconnect in high-speed memory systems," **8,712,249**, April 29, 2014.
130. Baker, R. J., "Resistive memory element sensing using averaging," **8,711,605**, April 29, 2014.
129. Baker, R. J., "Memory with correlated resistance," **8,681,557**, March 25, 2014.
128. Baker, R. J., "Reference current sources," **8,675,413**, March 18, 2014.

127. Baker, R. J., "Methods for sensing memory elements in semiconductor devices," **8,582,375**, November 12, 2013.
126. Linder, L. F., Renner, D., MacDougall, M., Geske, J., and Baker, R. J., "Dual well read-out integrated circuit (ROIC)," **8,581,168**, November 12, 2013.
125. Li, W., Schoenfeld, A., and Baker, R. J., "Method and apparatus for providing symmetrical output data for a double data rate DRAM," **8,516,292**, August 20, 2013.
124. Baker, R. Jacob, "Resistive memory element sensing using averaging," **8,441,834**, May 14, 2013.
123. Qawi, Q. I., Drost, R. J., and Baker, R. Jacob, "Increased DRAM-array throughput using inactive bitlines," **8,395,947**, March 12, 2013.
122. Baker, R. Jacob, "Memory with correlated resistance," **8,289,772**, October 16, 2012.
121. Lin, F. and Baker, R. Jacob, "Phase splitter using digital delay locked loops," **8,218,708**, July 10, 2012.
120. Baker, R. Jacob, "Subtraction circuits and digital-to-analog converters for semiconductor devices," **8,194,477**, June 5, 2012.
119. Baker, R. J., "Digital Filters for Semiconductor Devices," **8,149,646**, April 3, 2012.
118. Baker, R. J., "Error detection for multi-bit memory," **8,117,520**, February 14, 2012.
117. Baker, R. J., "Integrators for delta-sigma modulators," **8,102,295**, January 24, 2012.
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#### **INVITED TALKS (PARTIAL LISTING)**

- Harvard, Q. I. and Baker, R. J., "Low-Power, High-Bandwidth, and Ultra-Small Memory Module Design," a presentation covering semiconductor packaging, DRAM architectures, and I/O circuits. The goal of this work is to investigate replacing the currently used dual in-line memory modules (DIMMs) with a smaller and a lower power memory module, a "Nano-Module."
- Baker, R. J., and Campbell, K. A., "Reconfigurable Analog Electronics using the Memristor."
- Baker, R. J., and Saxena, V., "A K-Delta 1-Sigma Modulator for Wideband Analog-to-Digital Conversion."
- Li, K., Saxena, V., and Baker, R. J., "The Baker ADC: An Overview,"
- Saxena, V., and Baker, R. J., "High-Speed Op-Amp Design: Compensation and Topologies for Two and Three Stage Designs,"
- Baker, R. J., "Circuit Design for MLC Flash: Towards a Semiconductor Replacement for the Hard Disk Drive."
- Baker, R. J., Terman Award Acceptance Speech, given at the Frontiers in Education Conference (FIE 2007), Milwaukee, WI, October 11, 2007.
- Baker, R. J., "The One-Transistor, One-Capacitor (1T1C) Dynamic Random Access Memory (DRAM), and its Impact on Society," presented at the Franklin Institute, in the symposium honoring Dr. Robert H. Dennard and his receipt of the 2007 Benjamin Franklin Medal in Electrical Engineering, April 25, 2007.
- Baker, R. J. and Saxena, V., "Design of Bandpass Delta-Sigma Modulators: Avoiding Common Mistakes."
- Baker, R. J., "Sensing Circuits for Resistive Memory."
- Hadrick, M. and Baker, R. J., "Sensing in CMOS Imagers using Delta-Sigma Modulation."



- Baker, R. J., "Design of High-Speed CMOS Op-Amps for Signal Processing," IEEE/EDS Workshop on Microelectronics and Electron Devices (WMED), April, 2005
- Baker, R. J., "Delta-Sigma Modulation for Sensing," IEEE/EDS Workshop on Microelectronics and Electron Devices (WMED), April, 2004
- Rivera, B. and Baker, R. J., "Design and Layout of Schottky Diodes in a Standard CMOS Process," MURI Review, November, 2001.

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23. Moumouni, Y. and Baker, R. J., "Modeling, Simulation, and Implementation of a Solar Thermoelectric Energy Harvesting System," *Journal of Energy and Power Engineering*, vol. 10, pp. 296-312, 2016.
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#### REFERRED CONFERENCE PAPERS AND MAGAZINE ARTICLES

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79. Mellott, J. K., Monahan, E., Vinayaka, V., Namboodiri, S. P., Roy, A., and Baker, R. J., "Variable Fast Transient Digitizer," *IEEE 62nd International Midwest Symposium on Circuits and Systems*, August 4-7, pp. 125-128, 2019.
78. Vinayaka, V., Namboodiri, S. P., Abdalla, Kerstetter, B., Mata-Carlos, F., Senda, D., Skelly, J., Roy, A., and Baker, R. J., "Monolithic 8x8 SiPM with 4-bit Current-Mode Flash ADC with Tunable Dynamic Range," *Proceedings of the ACM Great Lakes Symposium on VLSI (GLSVLSI)*, pp. 57-62, Tysons Corner, VA, May 9-11, 2019.
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65. Moumouni, Y. and Baker, R. J., "Concise Thermal to Electrical Parameters Extraction of Thermoelectric Generator for Spice Modeling," *IEEE 58<sup>th</sup> International Midwest Symposium on Circuits and Systems*, pp. 596-599, August 2-5, 2015.
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  16. Baker, R. J., *Mixed-Signal Design in the Microelectronics Curriculum*, IEEE University/Government/Industry Microelectronics (UGIM) Symposium, June 30 - July 2.
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  9. Rivera, B., Baker, R. J., Melngailis, J., "Design and Layout of Schottky Diodes in a Standard CMOS Process," 2001 International Semiconductor Device Research Symposium, Washington DC, Dec. 2001.
  8. Hess, H. and Baker, R. J., "Easier Method to Simultaneously Trigger Series-Connected MOS Devices," *Power Systems World Conference 2000*, Boston, Massachusetts, September 2000.
  7. Baker, R. J., and Hess, H., "Transformerless Capacitive Coupling of Gate Signals for Series Operation of Power MOSFET Devices." *International Electric Machines and Drives Conference*, Seattle, Washington, May 1999, pp. 673-676.
  6. Baker, R. J., "A windows based integrated circuit design tool for distance education," *International Conference on Simulation and Multimedia in Engineering Education*.
  5. Chen, H. and Baker, R. J., "A CMOS Standard-Cell Library for the PC-based LASI Layout System," *Proceedings of the 41<sup>st</sup> International Midwest Symposium on Circuits and Systems*, August 9-12, 1998.



4. Liu, S. and Baker, R. J., "Process and temperature performance of a CMOS beta-multiplier voltage reference," *Proceedings of the 41<sup>st</sup> International Midwest Symposium on Circuits and Systems*, August 9-12, 1998.
3. Boyce, D.E. and Baker, R. J., "A Complete Layout System for the PC," *IEEE 40<sup>th</sup> International Midwest Symposium on Circuits and Systems*, 1997.
2. Baker, R. J., and Blair, J. J., "Step response considerations and the design of a suitable step generator for high speed digitizer testing," *LLNL's Third Annual Workshop on High Speed Digitizers*, April 3-4, Las Vegas, Nevada, 1991.
1. Baker, R. J., "Step-recovery diodes sharpen pulses," *Engineering Design News Magazine*, pp. 154-156, May 10, 1990.

## **EXPERT WITNESS EXPERIENCE**

The law firms and clients (underlined) whom I have provided expert witness services in electrical and computer engineering are listed below. I have been deposed 58 times, given expert testimony at 10 trials (6 USITC, 2 D. Del., 1 S.D. Cal., and 1 E.D. Tex.), and participated in 1 mediation.

### **Paul Hastings LLP (Austin, TX and Washington, DC)**

Case – Flex Logix Technologies, Inc. v. Konda Technologies Inc.

Case Numbers – IPR2020-00260, IPR2020-00261, and IPR2020-00260. Petitions filed on December 16, 2019.

Case Numbers – PGR2019-00037, PGR2019-00040, and PGR2019-00042. Petitions filed on March 18, 2019.

Case Subject Matter – FPGA layout routing for integrated circuits and networks, electrical and computer engineering.

Work Performed – Provided expert consulting services and wrote declarations for post grant and inter partes reviews.

### **DLA Piper (Chicago, IL, Houston, TX, and Washington, DC) and White & Case LLP (New York, NY and Washington, DC)**

Case – M-Red Inc. v. Panasonic Corporation

Case Number – Texas, ED (Marshall) 2:19-cv-00251. Complaint filed on July 16, 2019.

Case Subject Matter – Integrated circuit electronics adjustment, such as ring oscillators, using auto calibration. Evaluating a known good die using both wire and flip-chip interconnects.

Work Performed – Provided expert consulting services and wrote declaration for claim construction.

### **Paul Hastings LLP (Austin, TX and Washington, DC)**

Case – Samsung, Inc. v. NuCurrent, Inc.

Case Number – IPR2019-01217. Petition filed on June 19, 2019.

Case Numbers – PGR2019-00049 and PGR2019-00050. Petitions filed on May 28, 2019.

Case Subject Matter – Wireless power transmission using magnetic coupling via antennas and transformers.

Work Performed – Provided expert consulting services and wrote declarations for post grant and inter partes reviews. Was deposed two times.

### **Irell & Manella LLP (Los Angeles, CA)**

Case – VLSI Technology LLC v. Intel Corporation

Case Number – Texas, WD (filed in the Waco Division but then transferred to Austin Division) 6:19-cv-00256. Complaint filed on April 11, 2019.

Case Subject Matter – Static Random Access Memory (SRAM) having a variable power supply, methods for designing digital systems, and hardware managed interrupt control.

Work Performed – Provided expert consulting services.

**Paul Hastings LLP (Austin, TX and Washington, DC)**

Case – Samsung, Inc. v. ProMOS Technologies, Inc.

Case Numbers – IPR2019-00779, IPR2019-00780, IPR2019-00781, IPR2019-00784, and IPR2019-00785. Petitions filed on March 5, 2019.

Case Subject Matter – Programmable latches that include non-volatile programmable elements, digital delay elements, and decoders for memory chips.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed three times.

**Pillsbury Winthrop Shaw Pittman LLP (San Francisco, CA)**

Case – Kingston Technology Company, Inc. v. Memory Technologies, LLC

Case Numbers – IPR2019-00645, IPR2019-00648, IPR2019-00651, and IPR2019-00654. Petitions filed on January 31, 2019.

Case Numbers – IPR2019-00642, IPR2019-00643, and IPR2019-00644. Petitions filed on January 30, 2019.

Case Number – IPR2019-00638. Petition filed on January 29, 2019.

Case Subject Matter – Memory cards including PC cards, compact flash (“CF”) cards, secure digital (“SD”) cards, programmable credit cards, and embedded multimedia cards (“eMMC”). Uses of EEPROM and Flash memory in built-in operating system (BIOS).

Work Performed – Provided expert consulting services for inter partes reviews and wrote declarations.

**Russ August & Kabat (Los Angeles, CA)**

Case – Ring LLC v. SkyBell Technologies, Inc.

Case Numbers – IPR2019-00443, IPR2019-00444, IPR2019-00445, IPR2019-00446, and IPR2019-00447. Petitions filed on December 17, 2018.

Case Subject Matter – Electronic doorbell system with digital chime, video, motion detection, wired and wireless communication, and control panel.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed three times.

**O'Melveny & Myers LLP (San Francisco, CA)**

Case – Super Interconnect Technologies LLC v. Google LLC

Case Number – Texas, ED (Marshall) 2:18-cv-00463. Complaint filed November 2, 2018.

Case Subject Matter – Transmission of data and clock signals. Serial signals such as transition minimized differential signaling. Communications between processors and non-volatile storage such as Universal Flash Storage (UFS) and embedded MultiMedia Controller (eMMC).

Work Performed – Provided expert consulting services including expert reports.

**Baker Botts LLP (Austin, TX)**

Case – Semiconductor Components Industries, LLC d/b/a ON Semiconductor v. Power Integrations, Inc.

Case Numbers – IPR2018-01810, IPR2018-01812, IPR2018-01816, and IPR2018-01818. Petitions filed on September 28, 2018.

Case Subject Matter – Switched-mode power supplies (e.g., flyback, buck, boost), controllers, transformers, and sensing multiple voltage values.

Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

**Kirkland & Ellis LLP (Washington, DC) and Fish & Richardson P.C. (Washington, DC)**

Case – Samsung Electronics Co., LTD. and SK hynix Inc. v. BitMICRO, LLC

Case Number – IPR2018-01720. Petition filed on September 19, 2018.

Case Number – IPR2018-01545. Petition filed on August 23, 2018.

Case Subject Matter – Solid state storage drives, stacked consumer electronics components (3D packaging, solder balls, flip-chip, TSVs, etc.), and products.

Work Performed – Provided expert consulting services including writing declarations for inter partes reviews.

**Knobbe, Martens, Olson, & Bear, LLP (Los Angeles, CA) and White & Case LLP (Palo Alto, CA and Washington, DC)**

Case – Toshiba America Information Systems, Inc. and MSI Computer Corp. v. WalleTex Microelectronics Ltd.

Case Number – IPR2018-01538. Petition filed on August 10, 2018.

Case Subject Matter – Double-sided male USB and various card-shaped devices and connectors, electrical and computer engineering.

Work Performed – Provided expert consulting services including writing declarations for inter partes review and was deposed.

**Jones Day LLP (Cleveland, OH and Pittsburgh, PA)**

Case – Intel Corp. v. Qualcomm, Inc.

Case Numbers – IPR2018-01344 and IPR2018-01346. Petitions filed on July 6, 2018.

Case Numbers – IPR2018-01261, IPR2018-01293, and IPR2018-01295. Petitions filed on June 29, 2018.

Case Subject Matter – Communications, e.g. PCIe, USB, Firewire (IEEE-1394), between two processing nodes within a computing device such as a cell phone, tablet, or computer.

Work Performed – Provided expert consulting services for inter partes reviews including writing declaration and was deposed.

**Orrick, Herrington & Sutcliffe LLP (Menlo Park, CA) and Weil, Gotshal & Manges LLP (Redwood Shores, CA)**

Case – Micron Technology, Inc. v. North Star Innovations, Inc.

Case Numbers – IPR2018-00998 and IPR2018-00999. Petitions filed on May 1, 2018.

Case Number – IPR2018-00989. Petition filed on April 27, 2018.

Case Subject Matter – Output circuits for memory integrated circuits and voltage boosting circuits.

Work Performed – Provided expert consulting services including writing declarations for inter partes reviews, and was deposed.

**Paul Hastings LLP (Austin, TX and Washington, DC)**

Case – Samsung, Inc. v. Red Rock Analytics, LLC

Case Numbers – IPR2018-00555, IPR2018-00556, and IPR2018-00557. Petitions filed on February 5, 2018.

Case Subject Matter – Calibration of IQ balance in transceivers in wireless communications.

Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

**Covington & Burling LLP (Palo Alto, CA and Washington, DC)**

Case – Phenix (sic) Longhorn, LLC v. Texas Instruments, Inc.

Case Number - Texas, ED (Marshall) 2:18-cv-00020. Complaint filed January 22, 2018.

Case Subject Matter – Circuit with non-volatile memory for gamma correction in a display screen.

Work Performed – Provided expert consulting services, wrote declaration for claim construction, expert reports, and was deposed twice.

**Kirkland & Ellis LLP (Washington, DC) and Fish & Richardson P.C. (Washington, DC)**

Case – BitMICRO, LLC v. Samsung Electronics Co., LTD., SK hynix Inc., Dell Inc., Lenovo Group Inc., HP Inc., ASUSTek Computer Inc., ASUS Computer International, ACER Inc., VAIO Corporation, and Transcosmos America Inc.

Case Number – ITC Investigation No. 337-TA-1097. Complaint filed January 8, 2018.

Case Subject Matter – Solid state storage drives (SSDs), stacked electronics components (3D packaging, solder balls, flip-chip, TSVs, etc.), and products.

Work Performed – Provided expert consulting services including direct witness statement, deposition, and testified at trial for pilot 100-day ITC proceeding.

**Morrison & Foerster LLP (Los Angeles, CA)**

Case – SK hynix, Inc. v. Netlist, Inc.

Case Numbers – IPR2018-00364 and IPR2018-00365. Petitions filed on December 27, 2017.

Case Numbers – IPR2018-00362 and IPR2018-00363. Petitions filed on December 22, 2017.

Case Subject Matter – Memory modules, components, and products.

Work Performed – Provided expert consulting services for patent owner in inter partes reviews, wrote declarations, and was deposed twice.

**Quinn Emanuel Urquhart & Sullivan, LLP (San Francisco, CA and Chicago, IL) and Norton Rose Fulbright US LLP (Houston, TX)**

Case – Qualcomm, Inc. v. Apple, Inc.

Case Number – ITC Investigation No. 337-TA-1093. Complaint filed November 30, 2017.

Case Subject Matter – Certain mobile electronic devices and radio frequency and processing components thereof.

Work Performed – Provided expert consulting services.

**Baker Botts LLP (Austin, TX, and Houston, TX)**

Case – Semiconductor Components Industries, LLC d/b/a ON Semiconductor v. Power Integrations, Inc.

Case Number – IPR2018-00160. Petition filed on November 7, 2017.

Case Subject Matter – Switched-mode power supplies and power supply controllers.

Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

**Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (Boston, MA)**

Case – Netlist, Inc. v. SK hynix, Inc.

Case Number – ITC Investigation No. 337-TA-1089. Complaint filed on October 31, 2017.

Case Subject Matter – Memory modules and components thereof.

Work Performed – Provided expert consulting services including validity analysis, expert report, deposition, and testified at trial.

**Baker Botts LLP (Austin, TX, and Houston, TX)**

Case – ON Semiconductor and Semiconductor Components Industries v. Power Integrations, Inc.

Case Number – Delaware, 1:17-cv-00247. First amended complaint filed on September 8, 2017.

Case Subject Matter – Switched-mode power supplies and power supply controllers.

Work Performed – Provided expert consulting services.

**Quinn Emanuel Urquhart & Sullivan, LLP (San Francisco, CA, Chicago, IL and Seattle, WA)**

Case – Qualcomm, Inc. v. Apple, Inc.

Case Number – California, SD 3:17-cv-01375. Complaint filed on August 25, 2017.

Case Subject Matter – Electronics in consumer mobile devices.

Work Performed – Provided expert consulting services including infringement analysis, validity analysis, expert reports, was twice deposed, and testified at trial.

**Baker Botts LLP (Austin, TX, and Houston, TX)**

Case – Power Integrations v. ON Semiconductor and Semiconductor Components Industries

Case – ON Semiconductor and Semiconductor Components Industries v. Power Integrations, Inc.

Case Numbers – California, ND (San Jose) 5:16-cv-06371 and California ND (San Jose) 5:17-cv-03189.

Second amended complaint filed on August 14, 2017.

Case Subject Matter – Switched-mode power supplies and power supply controllers (power electronics).

Work Performed – Provided expert consulting services and wrote declaration for claim construction.

**Fish & Richardson P.C. (Washington, DC)**

Case – Ex Parte Reexamination

Case Number – 90/020,112. Request filed on July 31, 2017.

Case Subject Matter – Multi-level non-volatile floating gate memory (MLC), e.g. EPROM, EEPROM, and flash technologies.

Work Performed – Provided expert consulting services and wrote declaration.

**K&L Gates LLP (Chicago, IL)**

Case – United Microelectronics Corp., UMC Group (USA), Semiconductor Manufacturing International Corp. (Shanghai and Beijing), and SMIC (Americas), v. Lone Star Silicon Innovations LLC

Case Number – IPR2017-01513. Petition filed on July 20, 2017.

Case Subject Matter – CMOS circuit fabrication.

Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

**Bosch Jehle and Fieldfisher (Munich and Düsseldorf, Germany)**

Case – Netlist, Inc. v. SK hynix, Inc.

Case Number – Complaint filed on July 11, 2017 in the German Federal Patent Court.

Case Subject Matter – Memory modules and components and products containing same.

Work Performed – Provided expert consulting services and attended trial at the German Federal Patent Court in Munich.

**Quinn Emanuel Urquhart & Sullivan, LLP (San Francisco, CA, Chicago, IL, and Seattle, WA)**

Case – Qualcomm, Inc. v. Apple, Inc.

Case Number – ITC Investigation No. 337-TA-1065. Complaint filed July 7, 2017.

Case Subject Matter – Certain mobile electronic devices and radio frequency and processing components thereof.

Work Performed – Provided expert consulting services including infringement analysis, validity analysis, expert reports, was deposed, and testified at trial.

**Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (Boston, MA and Washington, DC)**

Case – Netlist, Inc. v. SK hynix

Case Number – California, CD 8:17-cv-01030. Complaint filed on June 14, 2017.

Case Subject Matter – Memory modules and components and products containing same.

Work Performed – Provided expert consulting services.

**Russ August & Kabat (Los Angeles, CA)**

Case – Document Security Systems, Inc. v. Lite-On, Inc.

Case Number – California, CD 2:17-cv-06050. Complaint filed on August 15, 2017.

Case – Document Security Systems, Inc. v. Everlight Electronics Co.

Case Number – California, CD 2:17-cv-04273. Complaint filed on June 8, 2017.

Case – Document Security Systems, Inc. v. Cree, Inc.

Case Number – California, CD 2:17-cv-04263. Complaint filed on June 8, 2017.

Case – Document Security Systems, Inc. v. Seoul Semiconductor Company, LTD.

Case Number – California, CD 8:17-cv-00981. Complaint filed on June 7, 2017.

Case Subject Matter – Light Emitting Diode ("LED") lighting products.

Work Performed – Provided expert consulting services, wrote claim construction declarations and was deposed.

**Dovel & Luner LLP (Santa Monica, CA)**

Case – X2Y Attenuators, LLC v. Intel Corporation

Case Number – Oregon, D (Portland) 3:18-cv-01394 (moved from Pennsylvania, WD [Erie]).  
Complaint filed June 22, 2017.

Case Subject Matter – Circuit arrangements that use relative groupings of energy pathways, electrical engineering.

Work Performed – Provided expert consulting services.

**Kirkland & Ellis LLP (New York, NY and Washington, DC)**

Case – Fundamental Innovation Systems International LLC v. Samsung Electronics Co., LTD.

Case Number – Texas, ED (Marshall) 2:17-cv-00145. Complaint filed May 15, 2017.

Case Subject Matter – Universal Serial Bus (USB) connections for data communications and charging.

Work Performed – Provided expert consulting services, wrote expert reports on invalidity and noninfringement, and was deposed.

**Paul Hastings LLP (Austin, TX and Washington, DC)**

Case – Samsung, Inc. v. ProMOS Technologies, Inc.

Case Numbers – IPR2017-01412, IPR2017-01413, IPR2017-01414, IPR2017-01415, and IPR2017-01416. Petitions filed on May 12, 2017.

Case Subject Matter – Delay-Locked Loop (DLL) design, power supplies, and sensing in semiconductor memory.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed three times.

**Baker Botts LLP (Austin, TX, Dallas, TX, and Palo Alto, CA)**

Case – SanDisk LLC v. Memory Technologies, LLC

Case Number – IPR2017-01420. Petition filed on May 10, 2017.

Case Number – IPR2017-01360. Petition filed on May 3, 2017.

Case Number – IPR2017-01116. Petition filed on March 20, 2017.

Case Number – IPR2017-01022. Petition filed on March 3, 2017.

Case Number – IPR2017-00868. Petition filed on February 9, 2017.

Case Subject Matter – Memory cards including PC cards, compact flash ("CF") cards, secure digital ("SD") cards, programmable credit cards, and multimedia cards ("MMC"). Uses of EEPROM and Flash memory in built-in operating system (BIOS).

Work Performed – Provided expert consulting services for inter partes review and wrote declarations.



**DLA Piper (Atlanta, GA and East Palo Alto, CA)**

Case – Macronix International Co. v. Toshiba, Inc.

Case Number – ITC Investigation No. 337-TA-1046. Complaint filed March 7, 2017.

Case Subject Matter – Non-volatile memory, such as flash and resistive (chalcogenide and programmable contact [PCM]) memory, and products containing the same.

Work Performed – Provided expert consulting services. Also provided Markman tutorial, expert reports, was deposed, and testified at trial.

**Morrison & Foerster LLP (Los Angeles, CA)**

Case – SK hynix, Inc. v. Netlist, Inc.

Case Number – IPR2017-00577. Petition filed on January 5, 2017.

Case Subject Matter – Memory modules, components, and products.

Work Performed – Provided expert consulting services for patent owner in an inter partes review, wrote declaration, and was deposed.

**McAndrews Held & Malloy LTD (Chicago, IL)**

Case – SK hynix, Inc. v. Netlist, Inc.

Case Number – IPR2017-00692. Petition filed on January 17, 2017.

Case Number – IPR2017-00587. Petition filed on January 6, 2017.

Case Number – IPR2017-00561. Petition filed on January 5, 2017.

Case Numbers – IPR2017-00560 and IPR2017-00562. Petitions filed on January 3, 2017.

Case Subject Matter – Volatile and non-volatile memory systems.

Work Performed – Provided expert consulting services for patent owner in an inter partes review, wrote declarations, and was deposed twice.

**O'Melveny & Myers LLP (Newport Beach and Los Angeles, CA)**

Case – Janus Semiconductor, LLC v. Micron Technology, Inc.

Case Number – Texas, ED (Marshall) 2:16-cv-01409. Complaint filed December 13, 2016.

Case Subject Matter – Self-timed and self-enabled distributed clocking in electronic integrated circuits.

Work Performed – Provided expert consulting services.

**Baker Botts LLP (Austin, TX, Dallas, TX, and Palo Alto, CA)**

Case – Memory Technologies, LLC v. SanDisk LLC and Western Digital Corporation

Case Number – ITC Investigation No. 337-TA-1034. Complaint filed November 30, 2016.

Case Subject Matter – SD Cards, microSD cards, programmable credit cards, eMMC (embedded Multi-Media Controller), and eMCP (embedded Multi-Chip Packages) products.

Work Performed – Provided expert consulting services and wrote declaration.

**Kilpatrick Townsend & Stockton LLP (Denver, CO and Shanghai, China)**

Case – Broadcom, Ltd. v. Invensas

Case Number – IPR2017-00171. Petition filed on October 31, 2016.

Case Subject Matter – Semiconductor random access memory circuit timing and operation.

Work Performed – Provided expert consulting services, wrote declaration, and was deposed.

**Paul Hastings LLP (Washington, DC)**

Case – Samsung, Inc. v. ProMOS Technologies, Inc.

Case Numbers – IPR2017-00036, IPR2017-00038, and IPR2017-00039. Petitions filed on October 7, 2016.

Case Subject Matter – Sensing in semiconductor memory integrated circuits.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed three times.

**Munck Wilson Mandala LLP (Dallas, TX)**

Case – ams AG, ams-TAOS, and Samsung v. JLL Technologies and 511 Innovations, Inc.  
Case Numbers – IPR2016-01788, IPR2016-01792, IPR2016-01793, IPR2016-01804, IPR2016-01810, IPR2016-01818, and IPR2016-01819. Petitions filed on September 14, 2016.  
Case Number – IPR2016-01787. Petition filed on September 13, 2016.  
Case Subject Matter – Color and optical measuring systems.  
Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

**Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (Boston, MA and Washington, DC)**

Case – Netlist, Inc. v. SK hynix, Inc.  
Case Number – ITC Investigation No. 337-TA-1023. Complaint filed on September 1, 2016.  
Case Subject Matter – Memory modules and components and products containing same.  
Work Performed – Provided expert consulting services including validity analysis, expert report, deposition, technology tutorial at trial, and trial testimony.

**Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (Boston, MA and Washington, DC)**

Case – Netlist, Inc. v. SK hynix  
Case Number – California, CD (Santa Ana) 8:16-cv-01605. Complaint filed on August 31, 2016.  
Case Subject Matter – Memory modules and components and products containing same.  
Work Performed – Provided expert consulting services and wrote declaration for claim construction.

**Baker & Hostetler LLP (Cleveland, OH)**

Case – Evolv, LLC v. Joyetech and Wismec  
Case Number – California, CD 8:16-cv-00459.  
Complaint filed on March 9, 2016. Case Subject Matter – Electronic personal vaporizers (also known as electronic cigarettes) containing power and USB battery charging electronics and switching power supplies using CMOS and power MOSFETs.  
Work Performed – Provided expert consulting services including lab testing and infringement analysis. Wrote declaration.

**Vinson & Elkins LLP (San Francisco, CA)**

Case – Polaris Innovations Limited v. Kingston Technology Company, Inc.  
Case Number – California, CD 8:16-cv-300. Complaint filed on February 19, 2016.  
Case Subject Matter – Semiconductor memory, circuits, and the design and fabrication of memory modules.  
Work Performed – Provided expert consulting services.

**Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. (Boston, MA)**

Case – Advanced Silicon Technologies LLC v. BMW, Fujitsu, Harman, Honda, NVIDIA, Renesas, Texas Instruments, Toyota, Volkswagen, and Audi  
Case Number – ITC Investigation No. 337-TA-984. Complaint filed on December 28, 2015.  
Case Subject Matter – Computing or graphics systems, components thereof, and vehicles containing same.  
Work Performed – Provided expert consulting services and wrote declaration for claim construction.

**DLA Piper (East Palo Alto, CA, Chicago, IL, and Reston, VA)**

Case – Lincoln Electric v. ESAB, Inc.

Case Number – Texas, ED (Marshall) 2:15-cv-01404. Complaint filed on December 15, 2015.

Case Subject Matter – Power electronics including switching power supplies using power MOSFETs for welding equipment.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, invalidity analysis, expert reports, and was deposed twice.

**Weil, Gotshal & Manges LLP (Houston, TX and Redwood Shores, CA)**

Case – Micron Technology, Inc. v. Innovative Memory Systems LLC

Case Numbers – IPR2016-00320, IPR2016-00322, IPR2016-00325, IPR2016-00326, and IPR2016-00327. Petitions filed on December 14, 2015.

Case Subject Matter – Data conversion, semiconductor fabrication, flash memory, and semiconductor memory device operation/control.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed three times.

**Munck Wilson Mandala LLP (Dallas, TX) and O'Melveny & Myers LLP (Los Angeles, CA)**

Case – 511 Innovations, Inc. v. Samsung, Huawei, ZTE, and ams-TAOS

Case Number – Texas, ED (Marshall) 2:15-cv-01526. Complaint filed on September 14, 2015.

Case Subject Matter – Color and optical measuring systems.

Work Performed – Provided expert consulting, claim construction, wrote declaration, expert reports, and was deposed twice.

**Davis Wright Tremaine LLP (San Francisco, CA and Seattle, WA) and Mayer Brown LLP (Washington, DC)**

Case – 511 Innovations, Inc. v. Microsoft and Avago

Case Number – Texas, ED (Marshall) 2:15-cv-01525. Complaint filed on September 14, 2015.

Case Subject Matter – Color and optical measuring systems.

Work Performed – Provided expert consulting services.

**Weil, Gotshal & Manges LLP (Houston, TX, Redwood Shores, CA, and Washington, DC)**

Case – Micron Technology, Inc. v. Limestone Memory Systems LLC

Case Numbers – IPR2016-00093, IPR2016-00094, IPR2016-00095, IPR2016-00096, and IPR2016-00097. Petitions filed on October 27, 2015.

Case Subject Matter – Semiconductor memory.

Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

**DLA Piper (East Palo Alto and Los Angeles, CA)**

Case – Apple, Inc. v. Longitude Flash Memory Systems S.A.R.L.

Case Number – IPR2015-01933. Petition filed on September 21, 2015.

Case Numbers – IPR2015-01924 and IPR2015-01925. Petitions filed on September 17, 2015.

Case Numbers – IPR2015-01908 and IPR2015-01909. Petitions filed on September 14, 2015.

Case Subject Matter – Non-volatile semiconductor flash memory fabrication and design.

Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

**Paul Hastings LLP (New York City, NY and Washington, DC)**

Case – Samsung, Inc. v. Elbrus International Limited

Case Numbers – IPR2015-01523 and IPR2015-01524. Petitions filed on June 26, 2015.

Case Subject Matter – High-speed, low-power data transfer.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed.

**Kilpatrick Townsend & Stockton LLP (Menlo Park and San Francisco, CA)**

Case – Consultant for SK hynix, Inc. on matters relating to investigation of certain patents owned by Longitude Licensing Ltd.

Case Subject Matter – Semiconductor random access memory and communication interfaces.

Work Performed – Provided expert consulting services in 2015.

**Ropes & Gray LLP (New York City, NY)**

Case – Samsung, Inc. v. Imperium IP Holdings (Cayman), Ltd.

Case Number – IPR2015-01233. Petition filed on May 21, 2015.

Case Subject Matter – Data interface circuits that can be either a single-ended interface or a differential interface.

Work Performed – Provided expert consulting services, wrote declarations for inter partes review, and was twice deposed.

**Morgan, Lewis & Bockius LLP (Palo Alto, CA)**

Case – Silergy Corporation v. Monolithic Power Systems, Inc.

Case Numbers – IPR2015-00803 and IPR2015-00804. Petitions filed on February 24, 2015.

Case Subject Matter – Microelectronic packaging.

Work Performed – Provided expert consulting services, wrote declarations for inter partes reviews, and was deposed.

**Weil, Gotshal & Manges LLP (Houston, TX, Redwood Shores, CA, and Washington, DC)**

Case – Limestone Memory Systems LLC v. Micron Technology, Inc.

Case Number – California, CD 8:15-cv-00278. Complaint filed on February 17, 2015.

Case Subject Matter – Semiconductor memory.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, and invalidity analysis.

**Jones Day LLP (San Diego, CA)**

Case – Micron Technology, Inc. v. eDigital Corp.

Case Number – IPR2015-00519. Petition filed on December 31, 2014.

Case Subject Matter – Methods for memory management in non-volatile flash memories.

Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

**Fish & Richardson P.C. (Atlanta, GA and Washington, DC)**

Case – Micron Technology, Inc. v. MLC Intellectual Properties and BTG USA/International Inc.

Case Number – IPR2015-00504. Petition filed on December 24, 2014.

Case Subject Matter – Multi-level non-volatile floating gate memory, e.g. EPROM, EEPROM, and flash technologies.

Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

**Weil, Gotshal & Manges LLP (Houston, TX and Redwood Shores, CA)**

Case – Innovative Memory Systems LLC v. Micron Technology, Inc.

Case Number – Delaware, 1:14-cv-01480. Complaint filed on December 15, 2014.

Case Subject Matter – Data conversion, semiconductor fabrication, flash memory, and semiconductor memory device operation/control.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, and invalidity analysis.

**Skadden, Arps, Slate, Meagher & Flom LLP & Affiliates (Palo Alto, CA)**

Case – ALFRED T. GIULIANO, Chapter 7 Trustee of the Ritz Estate; CPM ELECTRONICS INC.; E.S.E. ELECTRONICS, INC. and MFLASH, INC., on Behalf of Themselves and All Others Similarly Situated v. SanDisk Corp.

Case Number – California, ND (Oakland) 4:10-cv-02787. Fourth amended complaint filed on September 24, 2014.

Case Subject Matter – Non-volatile semiconductor flash memory fabrication and design.

Work Performed – Provided expert consulting services.

**DLA Piper (East Palo Alto and Los Angeles, CA)**

Case – Longitude Licensing Ltd. and Longitude Flash Memory Systems S.A.R.L., v. Apple, Inc.

Case Number – California, ND 3:14-cv-04275. Complaint filed on September 23, 2014.

Case Subject Matter – Non-volatile semiconductor flash memory fabrication and design.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, and invalidity analysis.

**Singularity LLP (Redwood Shores, CA)**

Case – VIA Technologies, Inc. v. ASUS Computer International, AUSTEK Computer, and ASMedia Technology, Inc.

Case Number – California, ND (San Jose) 5:14-cv-03586. Complaint filed on August 7, 2014.

Case Subject Matter – USB 3.0 circuits.

Work Performed – Provided expert consulting services including: noninfringement, invalidity, and trade-secret analyses. Wrote expert reports, was deposed twice, and participated in mediation.

**Paul Hastings LLP (New York City, NY and Washington, DC)**

Case – Cascades Computer Innovation, LLC v. Samsung Electronics Co., Ltd.

Case Number - Illinois, ED 14-cv-05691. Complaint filed on July 24, 2014.

Case Subject Matter – DRAM memory data transfer.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Morgan, Lewis & Bockius LLP (Palo Alto, CA)**

Case – Monolithic Power Systems, Inc. v. Silerqy Corporation

Case Number – California, ND 3:14-cv-01745. First amended complaint filed on July 7, 2014.

Case Subject Matter – Microelectronic packaging.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Ropes & Gray LLP (East Palo Alto, CA, New York City, NY, and Washington, DC)**

Case – Macronix International Co., Ltd. v. Spansion, Inc., Aerohive Networks, Allied Telesis, Ciena, Delphi Automotive, Polycom, Ruckus Wireless, ShoreTel, Tellabs, and TiVo

Case Number – ITC Investigation No. 337-TA-922. Complaint filed on June 27, 2014.

Case Subject Matter – Devices containing non-volatile memory and products containing the same.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, Markman tutorial, and expert report.

**Ropes & Gray LLP (Boston, MA and New York City, NY)**

Case – Imperium IP Holdings (Cayman), Ltd. v. Samsung, Inc.

Case Number – Texas, ED (Sherman) 4:14-cv-00371. Complaint filed on June 9, 2014.

Case Subject Matter – Data interface circuits that can be either a single-ended interface or a differential interface.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, expert reports, deposition, and testimony at the trial.

**Quinn Emanuel Urquhart & Sullivan, LLP (San Francisco, CA and Washington, DC)**

Case – Freescale Semiconductor, Inc. v. MediaTek, Inc., et. al.

Case Number – ITC Investigation No. 337-TA-920. Amended complaint filed on May 27, 2014.

Case Subject Matter – Semiconductor integrated circuits and devices containing the same.

Work Performed – Provided expert consulting services.

**DLA Piper (East Palo Alto and San Diego, CA)**

Case – GSI Technology, Inc. v. Cypress Semiconductor Corporation

Case Number – IPR2014-00419. Petition filed on February 7, 2014.

Case Subject Matter – Semiconductor static random access memory (SRAM) circuit design.

Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

**Ropes & Gray LLP (Washington, DC)**

Case – Macronix International Co., Ltd. v. Spansion, Inc., et al.

Case Number – Virginia, ED (Alexandria) 3:13-cv-00679. Complaint filed on November 20, 2013.

Case Subject Matter – Non-volatile semiconductor flash memory fabrication and design.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Cooley LLP (San Diego, CA)**

Case – HSM Portfolio LLC and Technology Properties Limited LLC v. Fujitsu, AMD, Qualcomm, Inc.,

Elpida, SK Hynix, Micron, ProMOS, SanDisk, Sony, ST Micro, Toshiba, ON, and Zoran

Case Number – Delaware, 1:11-cv-00770. Third amended complaint filed on June 28, 2013.

Case Subject Matter – Semiconductor sensing circuits.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**DLA Piper (East Palo Alto and San Diego, CA)**

Case – Cypress Semiconductor Corporation v. GSI Technology, Inc.

Case Number – California, ND 3:13-cv-02013. Complaint filed on May 1, 2013.

Case Subject Matter – Semiconductor static random access memory (SRAM) circuit design.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, and invalidity analysis.

**Montgomery McCracken Walker & Rhoads LLP (Philadelphia, PA)**

Case – Simon Nicholas Richmond v. Winchance Solar Fujian Technology, Target, Creative Industries, et. al.

Case Number – New Jersey, 3:13-cv-01954. Amended complaint filed on March 27, 2013.

Case Subject Matter – Circuitry including solar cells, charging circuits, re-chargeable batteries, energy conversion for solar lighting.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.



**DLA Piper (East Palo Alto, CA)**

Case – Intellectual Ventures I/II LLC v. Toshiba, Inc.

Case Number – Delaware, 1:13-cv-00453. Complaint filed on March 20, 2013.

Case Subject Matter – Semiconductor memory and electronic interface circuits.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, expert report, was deposed, and testified at trial.

**Alston & Bird, DLA Piper, Gibson Dunn, Katten, O'Melveny, Orrick, and WilmerHale (various locations in the USA)**

Case – Freescale v. Funai, CSR, Zoran, MediaTek, Vizio, Sanyo, TPE, Top Victory Electronics, Envision Peripherals, AmTRAN, and Marvell

Case Number – Texas, WD (Austin) 1:12-cv-00644. Amended complaint filed on January 14, 2013.

Case Subject Matter – Semiconductor circuitry for voltage regulators, bus terminations, packaging, and signal processing.

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, invalidity analysis, and Markman tutorial.

**Amin, Turocy & Watson LLP (San Jose and San Francisco, CA)**

Case – InvenSense, Inc. v. Robert Bosch GmbH

Case Subject Matter – Microelectromechanical systems (MEMS) sensor design and manufacture.

Work Performed – Provided expert consulting services in 2013.

**Morrison & Foerster LLP (Los Angeles, Palo Alto, and San Francisco, CA)**

Case – STMicroelectronics, Inc. v. InvenSense, Inc.

Case Number – California, ND 3:12-cv-02475. Complaint filed on May 16, 2012.

Case Subject Matter – Microelectromechanical systems (MEMS) sensors including Gyroscopes and accelerometers.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, and wrote declaration.

**Kilpatrick Townsend & Stockton LLP (Menlo Park and San Francisco, CA)**

Case – Consultant for SK hynix, Inc. on matters relating to investigation of certain patents owned by Round Rock Research LLC

Case Subject Matter – Semiconductor random access memory.

Work Performed – Provided expert consulting services in 2012.

**Keker & Van Nest LLP (San Francisco, CA)**

Case – Round Rock Research LLC v. SanDisk Corp.

Case Number – Delaware, 1:12-cv-00569. Complaint filed on May 3, 2012.

Case Subject Matter – Semiconductor non-volatile flash memory.

Work Performed – Provided expert consulting including: invalidity analysis, noninfringement analysis, expert reports, and was deposed.

**Perkins Coie LLP (San Diego, CA)**

Case – ASUS Computer International v. Round Rock Research LLC

Case Number – California, ND 3:12-cv-02099. Complaint filed on April 26, 2012.

Case Subject Matter – Semiconductor memory and image sensors (CMOS imagers).

Work Performed – Provided expert consulting, claim construction, noninfringement analysis, invalidity analysis, expert reports, and was deposed.

**Morgan, Lewis & Bockius LLP (Palo Alto, CA)**

Case – Dr. Michael Jaffe’ as insolvency administrator for Qimonda AG v. LSI, Atmel Corp., Cypress, MagnaChip, and ON Semiconductor

Case Number – California, ND 3:12-cv-03166 (San Francisco). Complaint filed on January 10, 2012.

Case Subject Matter – Semiconductor processing and manufacturing.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Useful Arts IP (Cupertino, CA)**

Case – Tezzaron (formerly Tachyon Semiconductor) v. Elm Technology Corporation

Case Number – Patent Interference No. 105,859. Declared on December 1, 2011.

Case Subject Matter – Packaging of semiconductors and through silicon vias (TSVs).

Work Performed – Patent interference, wrote declaration, and was deposed.

**Morgan, Lewis & Bockius LLP (Palo Alto, CA)**

Case – Nanya Technology Corporation v. Elpida Memory, Inc. and Kingston Technology Company, Inc.

Case Number – ITC Investigation No. 337-TA-821. Complaint filed on November 21, 2011.

Case Subject Matter – Semiconductor DRAM design, fabrication, and manufacture.

Work Performed – Provided expert consulting and reports on validity, infringement, and domestic industry. Also provided declarations and was deposed.

**Morgan, Lewis & Bockius LLP (Washington, DC)**

Case – Elpida Memory, Inc. v. Nanya Technology Corporation

Case Number – ITC Investigation No. 337-TA-819. Complaint filed on November 15, 2011.

Case Subject Matter – Semiconductor DRAM design, fabrication, and manufacture.

Work Performed – Provided expert consulting and reports on infringement, domestic industry, and validity. Also provided Markman tutorial, declarations, deposition, and testimony at the trial.

**Ropes & Gray LLP (New York City, NY)**

Case – Intellectual Ventures v. Sendai Nikon Corporation

Case Number – Delaware, 1:11-cv-01025. Complaint filed on October 26, 2011.

Case Subject Matter – CMOS image sensor design and manufacture.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Farella Braun + Martel LLP (San Francisco, CA)**

Case – Round Rock Research LLC v. Dell, Inc.

Case Number – Delaware, 1:11-cv-00976. Complaint filed on October 14, 2011.

Case Subject Matter – Semiconductor DRAM design and manufacture.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, and wrote declaration.

**Latham & Watkins LLP (San Francisco, CA)**

Case – Altera Corp. v. LSI Corp. and Agere Systems, Inc.

Case Number – California, ND 4:11-cv-03139. Complaint filed on June 24, 2011.

Case Subject Matter – Semiconductor devices and electronics including phase-locked loops and clock recovery circuits.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Fish & Richardson P.C. (Washington, DC)**

Case – Spansion LLC v. Samsung Electronics Co., Ltd., Apple, Inc., Nokia Corp., PNY Technologies, Inc. Research In Motion Corporation, Transcend Information Inc.

Case Number – ITC Investigation No. 337-TA-735. Complaint filed on August 6, 2010.

Case Subject Matter – Semiconductor flash memory manufacture, fabrication, and design.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Jones Day LLP (Palo Alto, CA)**

Case – LSI and Agere, Inc. v. Xilinx, Inc.

Case Number – New York, SD 1:09-cv-09719. Complaint filed on November 23, 2009.

Case Subject Matter – Semiconductor digital design and clocking.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Morrison & Foerster LLP (New York City, NY)**

Case – Innurvation, Inc. et al v. Fujitsu Microelectronics America, Inc., Sony Corporation of America, Toshiba America Electronics Components, Inc., and Freescale Semiconductor, Inc.

Case Number – Maryland, 1:09-cv-01416. Complaint filed on May 29, 2009.

Case Subject Matter – Semiconductor circuit layout.

Work Performed – Provided expert consulting, noninfringement analysis, and invalidity analysis.

**Wilson Sonsini Goodrich & Rosati P.C. (Palo Alto, CA)**

Case – Panavision Imaging, LLC, v. OmniVision Technologies, Inc., Canon U.S.A., Inc., Micron Technology, Inc., Aptina Imaging Corporation, and Aptina, LLC.

Case Number – California, CD 2:09-cv-01577. Complaint filed on March 6, 2009.

Case Subject Matter – CMOS image sensor (CMOS imager) design, fabrication, and manufacture.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, two expert reports, and wrote declaration.

**McDermott Will & Emery (Menlo Park, CA)**

Case – Volterra Semiconductor Corp. v. Primarion & Infineon Technologies North America & Infineon Technologies, A.G.

Case Number – California, ND 3:08-cv-05129. Complaint filed on November 12, 2008.

Case Subject Matter – High-performance analog and mixed-signal power management semiconductors and switching power supplies in CMOS using power MOSFETs.

Work Performed – Provided expert consulting, noninfringement analysis, invalidity analysis, two expert reports, and was deposed.

**Morrison & Foerster LLP (Palo Alto and San Francisco, CA) and Baker Botts LLP (Austin and Houston, TX)**

Case – Power Integrations, Inc. v. Fairchild Semiconductor International, Inc.

Case Number – Delaware, 1:08-cv-00309. Complaint filed on May 23, 2008.

Case Subject Matter – Power conversion integrated circuits used as power supplies for cell phones, LCD monitors, and computers. Circuits and techniques for the reduction of electromagnetic interference (EMI) and radio-frequency interference (RFI).

Work Performed – Provided expert consulting services, expert report, was deposed, and testified at re-trial for damages in November, 2018.

**pre-2008** Minor expert witness work. Was deposed twice, once as an expert witness and the other time as a corporate witness.