R. JACOB BAKER, PH.D., P.E.

professor emeritus of electrical and computer engineering

6775 Agave Azul Court
Las Vegas, NV 89120

(208) 850-0517 (Cell)

Email: rjacobbaker@gmail.com
Website: http://CMOSedu.com/jbaker/jbaker.htm

PROFESSIONAL SUMMARY

Russel Jacob Baker (R. Jacob Baker), Ph.D., P.E. (IEEE Student Member 1983, Member 1988, Senior Member 1997, and Fellow 2013) was born in Ogden, Utah, on October 5, 1964. He received the B.S. and M.S. degrees in electrical engineering from the University of Nevada, Las Vegas (UNLV) in 1986 and 1988. He received the Ph.D. degree in electrical engineering from the University of Nevada, Reno (UNR) in 1993. His Google Scholar profile is here and his ResearchGate profile is here.

From 1981-1987 he served in the United States Marine Corps (from September of 1982 in the Reserves, Fox Company, 2nd Battalion, 23rd Marines, 4th Marine Division). From 1985-1993 he worked for E. G. & G. Energy Measurements and the Lawrence Livermore National Laboratory designing nuclear diagnostic instrumentation for underground nuclear weapons tests at the Nevada Test Site. During this time he designed, and oversaw the fabrication and the electrical/mechanical manufacture of, over 30 electronic and electro-optic instruments including high-speed cable and fiber-optic receiver/transmitters, PLLs, frame- and bit-syncs for high-speed imaging, data converters, streak-camera sweep circuits, Pockels cell drivers, micro-channel plate gating circuits, and analog oscilloscope electronics. From 1991-1993 he was an adjunct faculty member in the Departments of Electrical Engineering at UNLV and UNR. From 1993-2000 he served on the faculty in the Department of Electrical Engineering at the University of Idaho (UI), first as an untenured assistant professor and then from 1998 as a tenured associate professor. In 2000 he joined a new electrical and computer engineering (ECE) program at Boise State University (BSU) where he was promoted to professor in 2002. He then served as the ECE department chair from 2004-2007. At BSU he helped establish graduate programs in ECE including, in 2006, the university's second PhD degree. In 2012 he rejoined the faculty at UNLV as a tenured full professor of ECE. During his tenure at the UI, BSU, and UNLV he has been the major professor to more than 100 graduate students.

Dr. Baker has done consulting for over 200 companies. His research/development activities are in: photonics, circuit design for wireless and wired communications, analog-to-digital/digital-to-analog data conversion and transmission, optoelectronics (imagers, displays, LIDARs, APDs, SiPMs, and associated electronics), analog and digital integrated circuit design and fabrication, design of diagnostic electrical and electro-optic instrumentation for scientific research, integrated electrical/biological circuits and systems, array (memory, imagers, and displays) fabrication and design, design of digital processors for signal processing, CAD tool development and online tutorials, low-power interconnect and packaging (electrical and optical) techniques, design of wired/wireless communication and interface circuits, circuit design for the use and storage of renewable energy, power electronics and power supply design, and the delivery of online engineering education. As a result of this work, he is the named inventor on over 150 US patents and the author of over 100 publications.

He is a member of the honor societies Eta Kappa Nu and Tau Beta Pi, a licensed Professional Engineer, a popular lecturer that has delivered over 50 invited talks around the world, an IEEE Fellow, and the author of the books CMOS Circuit Design, Layout, and Simulation, CMOS Mixed-Signal Circuit Design, and a coauthor of DRAM Circuit Design: Fundamental and High-Speed Topics. He received the 2000 Best Paper Award from the IEEE Power Electronics Society,

the 2007 Frederick Emmons Terman Award, the 2011 IEEE Circuits and Systems Education Award, and the 2021 Wiley-IEEE Press Textbook Award for the 4th Edition of his book CMOS Circuit Design, Layout, and Simulation.

His service activities include the IEEE Press Editorial Board (1999-2004), editor for the Wiley-IEEE Press Book Series on Microelectronic Systems (2010-2018), the Technical Program Chair of the 2015 IEEE 58th International Midwest Symposium on Circuits and Systems (MWSCAS 2015), the IEEE Solid-State Circuits Society (SSCS) Administrative Committee (2011-2016), Distinguished Lecturer for the SSCS (2012-2015), Technology Editor (2012-2014) and Editor-in-Chief (2015-2020) for the IEEE Solid-State Circuits Magazine, IEEE Kirchhoff Award Committee (2020-2023), and advisor for the student branch of the IEEE at UNLV (2013-2024).

INDUSTRY EXPERIENCE

2008 - present: Expert witness in intellectual property disputes in electrical, electro-optic, and computer engineering matters for: 1) district court and ITC patent disputes, 2) inter partes reviews at the PTAB, and 3) arbitrations and mediations.

2013 - 2022: Worked with Freedom Photonics, Santa Barbara, CA, 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 using LEDs, ILDs, PIN, APDs, and ROICs.

2017 - 2019: Worked with Vorpal 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. (and then 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 processors, voltage references and regulators, data converters, field-emitting display drivers, sensing for MRAM (using delta-sigma data conversion topologies), SRAMs, RFIDs, 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 technologies ranging from LED lighting to medical imaging using CMOS image sensors (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 processors.

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, communication networks, 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 ranging from the design of PC boards to, for example, the design of cable equalizers. Summarizing, 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), Mach-Zehnder interferometers, Pockels cells, krytrons, power MOSFETs, microwave techniques, power supplies, 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.

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, Navy, and the AFRL.
- Current and past research and development interests are:
  - Design and packaging of electrical/optical systems (e.g., LiDARs/LADARs) using LEDs, semiconductor lasers, lens for focusing and directing light, integrated circuits, and associated control and communication systems/circuits.
  - Capacitive sensing techniques using delta-sigma modulation and interfacing to sensors
  - Design of high-voltage and energy switching circuits
  - 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 in OFDM, WiFi, 802.11, Bluetooth, 3G, 4G, etc.
  - 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, fiber optics, 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.

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*.

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 Master's 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 58th 2015 International Midwest Symposium on Circuits and Systems, MWSCAS 2015, as advisor for the student branch of the IEEE at UNLV (2013-2023), and as the Technology Editor (2012-2014) and Editor-in-Chief (2015-2020) for the *IEEE Solid-State Circuits Magazine*, and IEEE Kirchhoff Award Committee (2020-2023).

ARMED FORCES

From 1981 to 1987 served in the United States Marine Corps (from September of 1982 in the Reserves, Fox Company, 2nd Battalion, 23rd Marines, 4th Marine Division), Honorable Discharge. Military Occupational Specialty (MOS) 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 22 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, ICSEng Keynote, ICySSS keynote, IEEE Computing and Communication Workshop (CCWC), IEEE Electron Devices Conference (NVMTS), 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).

RESEARCH FUNDING

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

- Baker, R. J., (2023-2024) "Silicon Germanium (SiGe) Avalanche Photo Diode (APD) Chip," Department of Energy, Mission Support and Test Services (MSTS), LLC, $120,000
- Baker, R. Jacob, (2017-2023) "Tiled Silicon Photomultiplier Array Read-Out Integrated Circuit," NASA, $29,999 (Phase I), $225,238 (Phase II), and $79,697 (Phase IIE)
- Goldman, J., Menezes, J., and Baker, R. J., (2021-2022) "Monitored Compression Therapy: Using Smart Technology to Optimize the Treatment of Lower Extremity Swelling," UNLV Sports Research & Innovation Initiative. Proof of Concept Grant Program, $50,000
- 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

DOCTORAL STUDENT SUPERVSION

10. Sachin Namboodiri – A Multi-channel MCP-PMT based Readout Integrated Circuit for LiDAR Applications (2020)
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. Yiyan 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

92. Abraham Castaneda – High Dynamic Range Actively Quenched Silicon-Germanium Single-Photon Avalanche Diodes (2025)
91. Jazmine Boloor – Survey of how Irregular Pathways in the Electrical System of the Human Heart Link to Different Heart Arrhythmias (2023)
90. Abraham Lopez – An Avalanche-Transistor-Based Pulse Generator Design For Infrared Laser Applications (2023)
89. David Santiago – Development of an Automated GPIB System for Characterization of SiGe Avalanche Photodiodes (2023)
88. Minsung Cho – Studies of Forward Projection Algorithms and Implementation on PC and FPGA (2023)
87. Armani Alvarez – A Control Integrated Circuit for a Hysteretic Flyback Power Converter (2022)
86. Francisco Mata-carlos – A Wearable Electronic Monitoring Device for Low Pressure Garment Applications and Temperature Analysis for Prevention of Ulceration and Infection (2022)
85. Daniel Senda – Designs and Outcomes of Transcranial Magnetic Stimulation (TMS) and Repetitive Transcranial Magnetic Stimulation (rTMS) Circuits (2021)
84. James Skelly – Monitored Compression Therapy: Using Smart Technology to Optimize the Treatment of Lower Extremity Swelling (2021)
83. Gonzalo Arteaga – Current-mode photon-counting circuit with SiGe BiCMOS input stage (2020)
82. Jason Silic – Design and Fabrication of a 6-bit Current-Mode ADC for Lidar and High-Speed Applications (2020)
81. Brandon Wade (2020)
80. Mario Valles Montenegro – Front-End CMOS Transimpedance Amplifiers on a Silicon Photomultiplier Resistant to Fast Neutron Fluence (2020)
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 Appikatla (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)
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- 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."
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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 117 times, given expert testimony at 15 trials (8 USITC, 2 D. Del., 1 Arbitr., 1 S.D. Cal., 1 N.D. Ga., 1 D. Ore., and 1 E.D. Tex.), and participated in 1 mediation.

Paul Hastings LLP (Washington, DC)

Case – Ex Parte Reexamination
Case Number – 90/015361. Request filed on June 30, 2025.
Case Subject Matter – AC light emitting diode and AC LED drive methods and apparatus.
Work Performed – Provided expert consulting services and wrote declaration.

Smith Baluch LLP (Washington, DC)

Case – *Google LLC* v. Valtrus Innovations Limited
Case Number – IPR2025-01157. Petition filed on June 13, 2025.
Case Subject Matter – Power supplies to provide power to devices when it is important to ensure continuous electrical power, even if a source of power fails.
Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

Paul Hastings LLP (Boston, MA and Washington, DC)

Case – *Taiwan Semiconductor Manufacturing Company (TSMC) and Apple Inc.*, v. Marlin Semiconductor Limited
Case Number – IPR2025-00864. Petition filed on April 18, 2025.
Case Subject Matter – Semiconductor manufacturing process using a hard mask on the metal gate to form contacts structure simultaneously during etching.
Work Performed – Provided expert consulting services and wrote declaration for inter partes review.

Alston & Bird LLP (Washington, DC, Atlanta, GA and Charlotte, NC)

Case – Credo Semiconductor Inc. v. Amphenol, *Molex*, TE Connectivity, and Volex
Case Numbers – ITC Investigation No. 337-TA-1446. Complaint filed March 13, 2025.
Case Subject Matter – high-speed communications employing equalization, data recovery, serializer-deserializer (SerDes), and digital communications.
Work Performed – Provided expert consulting services.

Pillsbury Winthrop Shaw Pittman LLP (San Francisco, CA)

Case – *Transcend Information Inc.* v. Truesight Communications LLC
Case Number – IPR2025-00723. Petition filed on March 12, 2025.
Case Subject Matter – High-speed secure content transfer to a secured digital (SD) card from a kiosk.
Work Performed – Provided expert consulting services for inter partes review and wrote declaration.

DLA Piper LLP (Los Angeles, CA, Palo Alto, CA, and Austin, TX)

Case – *BOE Technology Group Co., Ltd.* v. Optronic Sciences LLC
Case Number – IPR2025-00239. Petition filed on March 7, 2025.
Case Number – IPR2025-00238. Petition filed on February 19, 2025.
Case Subject Matter – Imaging pixels, layout, and fabrication. Light emitting devices, including packaging, covers, and structures. Imager pixel circuitry.
Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

Fish & Richardson P.C. (Washington, DC and Minneapolis, MN)

Case – *Apple Inc.* v. Imberatek LLC
Case Numbers – IPR2025-00575, IPR2025-00583, and IPR2025-00584. Petitions filed on February 6, 2025.
Case Subject Matter – Construction of an electronic module.
Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

Pillsbury Winthrop Shaw Pittman LLP (San Francisco, CA)

Case – *MediaTek, Inc.* v. Redstone Logics LLC

Case Number – IPR2025-00085. Petition filed on October 22, 2024.

Case Subject Matter – multi-core processors with voltage and clock scaling functionality and related communications/control signaling.

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

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

Case – Palisade Technologies, LLP v. *Micron Technology, Inc.*

Case Number – Texas, WD (Midland) 7:24-cv-00262. Complaint filed October 16, 2024.

Case Subject Matter – Semiconductor devices, voltage regulators, memory cards, three-dimensional (3D) memory, universal serial bus (USB) interfaces to memory.

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

Baker Botts LLP (Houston, TX)

Case – *Innolux Corporation* v. Phenix Longhorn LLC

Case Numbers – IPR2025-00043 and IPR2025-00044. Petitions filed on October 15, 2024.

Case Subject Matter – Systems and methods for outputting "corrected" gamma reference voltages to drive a Liquid Crystal Display (LCD).

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

Dority & Manning LLP (San Diego, CA and Greenville, SC)

Case – *LithiumHub, LLC* v. Bass Pro Outdoor et. al.

Case Numbers – ITC Investigation No. 337-TA-1421. Complaint filed September 12, 2024.

Case Subject Matter – starting a combustion engine using lithium-based battery cells and solid-state switches.

Work Performed – Provided expert consulting services. Wrote declaration for a claim construction brief and expert reports. Was deposed twice.

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

Case – *Silicon Motion Inc.* v. K.Mizra, LLC

Case Number – IPR2024-01236. Petition filed on September 10, 2024.

Case Number – IPR2024-01240. Petition filed on August 13, 2024.

Case Number – IPR2024-01241. Petition filed on August 9, 2024.

Case Subject Matter – Calibrating a memory controller for use with DDR (double-data rate) DRAM (dynamic random access memory). Calibrating a communication channel to receive a digital signal. A micro-threaded memory device.

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

Garlick & Markison, LLC (Phoenix, AZ and Austin, TX)

Case – Ex Parte Reexamination

Case Number – 90/019612. Request filed on August 6, 2024.

Case Subject Matter – Semiconductor manufacturing processes, fabrication and packaging of integrated circuits, layout and routing of signal lines.

Work Performed – Provided expert consulting services and wrote declaration**.**

Bookoff McAndrews, PLLC (Washington, DC)

Case – *Lenovo Inc.* v. Intellectual Ventures II LLC

Case – *Lenovo Inc.* v. University of Rochester

Case Numbers – IPR2024-01225 and IPR2024-01226. Petitions filed on August 2, 2024.

Case Subject Matter – Methods for calibrating intra-cycle timing in digital communications. Digital circuits with multiple clock domains.

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

Wolf, Greenfield & Sacks, P.C. (Washington, D.C., and Boston, MA)

Case – *Infineon Technologies* v. Innoscience Technology

Case Numbers – ITC Investigation No. 337-TA-1414. Complaint filed July 26, 2024.

Case Subject Matter – GaN-on-Si semiconductor devices, GaN field effect transistors (FETs), and packaging power transistors.

Work Performed – Provided expert consulting services including expert reports. Was deposed and testified at trial.

DLA Piper LLP (Palo Alto, CA and Austin, TX)

Case – *BOE Technology Group Co., Ltd.* v. Optronic Sciences LLC

Case Numbers – IPR2024-01130, IPR2024-01133, and IPR2024-01134. Petitions filed on July 5, 2024.

Case Subject Matter – Imaging pixels, layout, and fabrication. Light emitting devices, including packaging, covers, and structures.

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

Dentons US LLP (Washington, DC)

Case – *Reolink Digital Technology Co., Ltd.* v. KT Imaging US, LLC

Case Numbers – IPR2024-01154 and IPR2024-01155. Petitions filed on July 3, 2024.

Case Subject Matter – Image sensor structure and package with integrated lens module for digital image products such as digital cameras, camera phones, video phones, fingerprint readers and so on.

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

Paul Hastings LLP (Washington, DC)

Case – Ex Parte Reexaminations

Case Numbers – 90/019,560, 90/019,962, and 90/019,964. Requests filed on July 1, 2024.

Case Numbers – 90/019,556, 90/019,557, and 90/019,558. Requests filed on June 28, 2024.

Case Subject Matter – Wireless charging systems, power sources, and inductive receivers for charging mobile devices.

Work Performed – Provided expert consulting services and wrote declarations for ex parte reexaminations.

Banner Witcoff (Chicago, IL and Washington, DC)

Case – *ZF Friedrichshafen AG, ZF Active Safety and Electronics US LLC, and Nissan Motor Company, Ltd.* v. Foras Technologies, Ltd.

Case Number – IPR2024-00969. Petition filed on June 24, 2024.

Case Subject Matter – Detecting loss of lockstep between pairs of processors and loss of lockstep recovery

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

Sheppard, Mullin, Richter & Hampton LLP (Menlo Park, CA and San Diego, CA)

Case – Concurrent Ventures, LLC and XtreamEdge, Inc. v. *Advanced Micro Devices (AMD), Inc. and Pensando Systems, Inc.*

Case Number – Texas, WD (Austin) 1:24-cv-00335. Complaint filed March 29, 2024.

Case Subject Matter – System and method for dividing and synchronizing a processing task across multiple processing elements/processors in hardware.

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

Fish & Richardson P.C. (San Diego, CA and Boston, MA)

Case – *Vicor Corporation* v. Delta Electronics, Inc.

Case Numbers – IPR2024-00704, IPR2024-00705, IPR2024-00706, and IPR2024-00715. Petitions filed on March 25, 2024.

Case Subject Matter – Power converters including design, packaging, heatsinking and manufacturing. Resonant converters with overcurrent protection.

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

Morgan, Lewis & Bockius LLP (Los Angeles, CA, Palo Alto, CA, and San Francisco, CA)

Case – Monolithic Power Systems, Inc. v. *Reed Semiconductor, Nengda Microelectronics, and Nengda Semiconductor*

Case Numbers – Delaware, 1:24-cv-00165 and Delaware, 1:24-cv-00166. Complaints filed on February 8, 2024, and March 15, 2024.

Case Subject Matter – Switching power supply design including bootstrap refresh circuits, pseudo constant-on time control, step down regulators, power supply controller chips.

Work Performed – Provided expert consulting services and wrote expert reports.

Pillsbury Winthrop Shaw Pittman LLP (San Francisco, CA)

Case – Redstone Logics LLC v. *MediaTek, Inc.*

Case Number – Texas, WD (Midland/Odessa) 7:24-cv-00029. Complaint filed January 26, 2024.

Case Subject Matter – multi-core processors with voltage and clock scaling functionality and related communications/control signaling.

Work Performed – Provided expert consulting services including writing declaration for claim construction.

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

Case – RoadRunner Recycling, Inc. v. *Recycle Tract Systems*

Case Number – California, ND 3:23-cv-04804. Amended complaint filed on January 16, 2024.

Case Subject Matter – Waste and recycling metering technology.

Work Performed – Provided expert consulting services including writing expert report. Was deposed.

Winston & Strawn LLP (Redwood City, CA, San Francisco, CA, and New York, NY)

Case – ACQIS LLC v. *Cisco Systems, Inc.*

Case Number – Texas, WD (Waco) 6:23-cv-00884. Complaint filed on December 22, 2023.

Case Subject Matter – Computer systems for multi-processing purposes. Modular computing using portable and desktop systems, backing up information, docking stations, low-voltage differential signaling using serial communications.

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

Winston & Strawn LLP (Los Angeles, CA and Redwood City, CA)

Case – *Silicon Motion, Inc.* v. Unification Technologies LLC

Case Number – IPR2024-00199. Petition filed on December 18, 2023.

Case Subject Matter – Memory controller, solid-state drive (SSD), flash non-volatile memory management, memory controller operation and addressing.

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

DLA Piper LLP (Palo Alto, CA and Austin, TX)

Case –Optronic Sciences LLC v. *BOE Technology Group Co.*

Case Number – Texas, ED (Marshall) 2:23-cv-00549. Complaint filed on November 22, 2023.

Case Subject Matter – Imaging pixels, layout, and fabrication. Light emitting devices, including packaging, covers, and structures.

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

Garlick & Markison, LLC (Austin, TX)

Case – *NXP USA, Inc.* v. Bell Semiconductor, LLC

Case Numbers – IPR2024-00167 and IPR2024-00168. Petitions filed on November 9, 2023.

Case Subject Matter – Semiconductor manufacturing processes, fabrication and packaging of integrated circuits, layout and routing of signal lines.

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

Unified Patents, LLC (Washington, DC)

Case – Ex Parte Reexamination
Case Number – 90/019288. Request filed on October 20, 2023.
Case Subject Matter – Power conversion device to drive an alternating-current motor for an electric vehicle.
Work Performed – Provided expert consulting services and wrote declaration.

Haynes and Boone, LLP (Dallas, TX)

Case – *Western Digital Technologies, Inc.* v. Longitude Licensing LTD.
Case Number – IPR2023-01200. Petition filed on July 14, 2023.
Case Subject Matter – Communications between a memory controller and memory.
Work Performed – Provided expert consulting services, wrote declaration for inter partes review, and was deposed.

Paul Hastings LLP (Washington, DC)

Case – *Samsung Electronics Co., Ltd.* v. Mojo Mobility, Inc.
Case Numbers – IPR2023-01094, IPR2023-01095, IPR2023-01096, IPR2023-01097, IPR2023-01098, IPR2023-01099, IPR2023-01100, and IPR2023-01124. Petitions filed on June 30, 2023.
Case Numbers – IPR2023-01101 and IPR2023-01102. Petitions filed on June 29, 2023.
Case Numbers – IPR2023-01091, IPR2023-01092, and IPR2023-01093. Petitions filed on June 28, 2023.
Case Numbers – IPR2023-01086, IPR2023-01087, IPR2023-01088, IPR2023-01089, and IPR2023-01090. Petitions filed on June 27, 2023.
Case Subject Matter – Wireless charging systems, power sources, and inductive receivers for charging mobile devices.
Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

Winston & Strawn LLP (Los Angeles, CA, Redwood City, CA, Chicago, IL, and Houston, TX)

Case – Unification Technologies LLC v. *Silicon Motion, Inc.*
Case Number – Texas, ED (Marshall) 2:23-cv-00267. Complaint filed June 2, 2023.
Case Subject Matter – Memory controller, solid-state drive (SSD), flash non-volatile memory management, memory controller operation and addressing.
Work Performed – Provided expert consulting services.

Norton Rose Fulbright LLP (Austin, TX and Dallas, TX)

Case – *Current Lighting Solutions, LLC d/b/a GE Current* v. Jiaxing Super Lighting Electric Appliance Co., Ltd.
Case Numbers – IPR2023-00979 and IPR2023-00980. Petitions filed on May 31, 2023.
Case Number – IPR2023-00270. Petition filed on December 19, 2022.
Case Number – IPR2023-00271. Petition filed on December 14, 2022.
Case Subject Matter – LED lighting, lamps, tube lamps, assembly, and associated circuits and electronics.
Work Performed – Provided expert consulting services and wrote declarations for inter partes review.

Faegre Drinker Biddle & Reath LLP (San Francisco, CA, Washington, DC, and Minneapolis, MN)

Case – CogniPower LLC v. *Samsung Electronics*
Case Number – Texas, ED (Marshall) 2:23-cv-00160. Complaint filed April 10, 2023.
Case Subject Matter – Power conversion using switching power supplies.
Work Performed – Provided expert consulting services, wrote expert reports, and was deposed.

Baker Botts LLP (Dallas, TX)

Case – *Lennox Industries Inc.* v. Rosen Technologies LLC
Case Numbers – IPR2023-00715, IPR2023-00716, IPR2023-00717, IPR2023-00718, and IPR2023-00719. Petitions filed on March 29, 2023.
Case Subject Matter – Thermostat system communications, programming, and displays.
Work Performed – Provided expert consulting services and wrote declarations for inter partes reviews.

Cooley LLP (Palo Alto, CA)

Case – *Nintendo Co., Ltd. and Nintendo of America Inc.* v. Polaris PowerLED Technologies, LLC

Case Number – IPR2023-00778. Petition filed on March 28, 2023.

Case Subject Matter – Visual displays, circuit design, and related technologies.

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

Bracewell LLP (New York, NY and Seattle, WA)

Case – *Kioxia America, Inc. and Kioxia Corporation* v. BiTMICRO LLC

Case Numbers – IPR2023-00741, IPR2023-00742, and IPR2023-00743. Petitions filed on March 23, 2023.

Case Subject Matter – Solid-state storage devices utilizing multi-profile memory controllers. Optimizing memory operations in a memory system suitable for use in an electronic storage device. Supplying energy to a cache memory using a super capacitor.

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

Bookoff McAndrews, PLLC (Washington, DC)

Case – *Lenovo Inc. and Motorola Mobility LLC* v. Theta IP, LLC

Case Numbers – IPR2023-00694, IPR2023-00697, and IPR2023-00698. Petitions filed on March 7, 2023.

Case Subject Matter – Power in wireless communication circuits.

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

Sheppard, Mullin, Richter & Hampton LLP (Menlo Park, CA and San Diego, CA)

Case – Semiconductor Design Technologies LLC v. *Cadence Design Systems, Inc.*

Case Number – California, ND 3:23-cv-01001. Complaint filed March 6, 2023.

Case Subject Matter – Semiconductor design support device/method and manufacturing method for semiconductor integrated circuit.

Work Performed – Provided expert consulting services.

McDermott Will & Emery LLP (Chicago, IL and Austin, TX)

Case – *Xilinx, Inc.* v. Polaris Innovations Limited

Case Numbers – IPR2023-00513 and IPR2023-00514. Petitions filed on February 6, 2023.

Case Subject Matter – Methods for terminating a memory chip with various termination resistances and output drivers for integrated circuits.

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

Willkie Farr & Gallagher LLP (San Franciso, CA)

Case –Bell Semiconductor, LLC. v. *Synopsys, Inc.*

Case Number – California, SD 3:22-cv-00594. Complaint filed on January 31, 2023.

Case Subject Matter – Integrated circuit design computer-aided design (CAD) tools for routing, design rule checking, layout versus schematic, electrical checking, dummy fill, reducing capacitance.

Work Performed – Provided expert consulting services and wrote expert reports.

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

Case – Element Capital Commercial Company PTE. LTD v. *BOE Technology Group Co. LTD and Motorola (Wuhan) Mobility*

Case Number – Texas, ED (Marshall) 2:22-cv-00118. Complaint filed January 11, 2023.

Case Subject Matter – Display technology, layout, circuit design, pixel design and fabrication.

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

Baker Botts LLP (San Franciso, CA and New York, NY) and O'Melveny & Myers LLP (Los Angeles, CA)

Case – Polaris PowerLED, LLC v. *Samsung Electronics and Samsung Display*

Case Number – Texas, ED (Marshall) 2:22-cv-00469. Complaint filed December 12, 2022.

Case Subject Matter – active matrix organic light-emitting diode (AMOLED) displays, controlling the intensity of light-emitting diodes in backlights of displays, control circuits for adjusting current delivery based upon temperature.

Work Performed – Provided expert consulting services including writing a declaration for claim construction.

Arnold & Porter (Los Angeles and Palo Alto, CA) and Willkie Farr & Gallagher LLP (San Franciso, CA)

Case – *Synopsys, Inc. and Cadence Design Systems, Inc.* v. Bell Semiconductor, LLC.

Case Number – Delaware, 1:22-cv-01512. Complaint filed on November 18, 2022.

Case Subject Matter – Integrated circuit design computer-aided design (CAD) tools for routing, design rule checking, layout versus schematic, electrical checking, dummy fill, reducing capacitance.

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

Paul Hastings LLP (Washington, DC)

Case – Ex Parte Reexaminations

Case Numbers – 90/015155 and 90/015156. Requests filed on November 7, 2022.

Case Number – 90/015134. Request filed on October 14, 2022.

Case Number – 90/015130. Request filed on September 30, 2022.

Case Subject Matter – Packaging and fabrication of light emitting diodes (LEDs).

Work Performed – Provided expert consulting services and wrote declaration.

Russ August & Kabat (Los Angeles, CA)

Case – *Resonant Systems, Inc.* v. Sony

Case Number – Texas, ED (Marshall) 2:22-cv-00424. Complaint filed on October 26, 2022.

Case Subject Matter – Linear vibration modules and linear-resonant vibration modules.

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

Sheppard, Mullin, Richter & Hampton LLP (Menlo Park, CA and San Diego, CA) and Willkie Farr & Gallagher LLP (San Francisco, CA)

Case – Bell Semiconductor, LLC v. *NXP*, SMC, Micron, Nvidia, *Advanced Micro Devices (AMD)*, *Acer*, Infineon, Qualcomm, Motorola Mobility, and Western Digital

Case Number – ITC Investigation No. 337-TA-1340. Complaint filed October 6, 2022.

Case Subject Matter – Electronic devices, semiconductor devices, and components.

Work Performed – Provided expert consulting services.

O'Melveny & Myers LLP (Los Angeles, CA)

Case – Daedalus Prime LLC v. *Samsung Electronics* and Qualcomm Inc.

Case Number – ITC Investigation No. 337-TA-1335. Complaint filed September 12, 2022.

Case Subject Matter – Semiconductor devices, mobile devices, and components.

Work Performed – Provided expert consulting services.

Fish & Richardson P.C. (Boston, MA, Houston, TX, and Washington, DC)

Case – Sonrai Memory LTD. v. *Micron Technology, Inc.*

Case Numbers – Texas, WD (Waco) 6:22-cv-00855 and Texas, WD (Waco) 1:23-cv-01407. Complaint filed August 16, 2022.

Case Subject Matter – Portable RAM drive and variable charge pump circuit with dynamic load.

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

Russ August & Kabat (Los Angeles, CA and New York, NY)

Case – *NextGen Innovations, LLC* v. Infinera, Fujitsu, AT&T, and Nokia

Case Number – Texas, ED (Marshall) 2:22-cv-00306, Texas, ED (Marshall) 2:22-cv-00307, Texas, ED (Marshall) 2:22-cv-00308, and Texas, ED (Marshall) 2:22-cv-00309. Complaints filed on August 9, 2022.

Case Subject Matter – optical transmission systems including optical components for encoding, transmission (fiber optic transmitters and receivers), and decoding of data and related standards and concepts.

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

DLA Piper (Chicago, IL and Washington, DC)

Case – Ampt, LLC v. *SolarEdge Technologies, Inc.*

Case Number – ITC Investigation No. 337-TA-1327. Complaint filed July 28, 2022.

Case Subject Matter – Solar power optimizers, inverters, and components.

Work Performed – Provided expert consulting services including writing declarations for claim construction, expert reports, and was deposed.

Orrick, Herrington & Sutcliffe LLP (Houston, TX, and Irvine, CA)

Case – Signify North America Corporation v. *Shenzhen Intellirocks Tech Co.*

Case Number – Texas, WD (Waco) 6:22-cv-00760. Complaint filed on July 8, 2022.

Case Subject Matter – LED packaging, circuits, and systems.

Work Performed – Provided expert consulting services including writing declaration for claim construction. Was deposed.

Baker Botts LLP (Dallas, TX)

Case – Rosen Technologies LLC v. *Lennox Industries Inc.*

Case Number – Texas, ND (Dallas) 3:22-cv-00732. Complaint filed on June 7, 2022.

Case Subject Matter – Thermostat system communications, programming, and displays.

Work Performed – Provided expert consulting services.

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

Case – *Samsung Electronics Co., Ltd.* v. Scramoge Technology Ltd.

Case Numbers – IPR2022-01052, IPR2022-01053, and IPR2022-01058. Petitions filed on May 26, 2022.

Case Numbers – IPR2022-01054, IPR2022-01055, IPR2022-01056, and IPR2022-01057. Petitions filed on May 24, 2022.

Case Number – IPR2022-00939. Petition filed on April 29, 2022.

Case Subject Matter – An antenna that supports wireless charging using switching power supplies such as flyback converters.

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

Orrick, Herrington & Sutcliffe LLP (Houston, TX, Irvine, CA, and Menlo Park, CA)

Case – Ex Parte Reexaminations

Case Number – 90/015020. Request filed on May 2, 2022.

Case Number – 90/014906. Request filed on November 12, 2021.

Case Number – 90/014899. Request filed on November 10, 2021.

Case Number – 90/014888. Request filed on October 21, 2021.

Case Numbers – 90/014886 and 90/014887. Requests filed on October 20, 2021.

Case Number – 90/014885. Request filed on October 19, 2021.

Case Subject Matter – Universal Serial Bus (USB) for charging.

Work Performed – Provided expert consulting services and wrote declarations**.**

DLA Piper (Chicago, IL, Austin, TX, and Washington, DC)

Case – *SolarEdge Technologies, Inc.* v. Fronius International GMBH

Case Number – IPR2022-00849. Petition filed on April 14, 2022.

Case Subject Matter – Mechanical assembly and enclosure whereby an upper housing part is detached from a lower housing part using a "rotate-and-lift" feature.

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

Kirkland & Ellis LLP (New York, NY)

Case – *Samsung Electronics Co.* v. Sonrai Memory Ltd.

Case Numbers – IPR2022-00305 and IPR2022-00306. Petitions filed on December 10, 2021.

Case Subject Matter – USB devices and circuits for saving power.

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

Haynes and Boone, LLP (Washington, DC)

Case – *Unified Patents, LLC* v. Arigna Technology Limited

Case Number – IPR2022-00285. Petition filed on December 9, 2021.

Case Subject Matter – High voltage driver circuit for driving power devices such as insulated gate bipolar transistors (IGBTs).

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

Paul Hastings LLP (Washington, DC)

Case – *Samsung Electronics Co., Ltd.* v. Lynk Labs, Inc.

Case Numbers – IPR2022-00149 and IPR2022-00150. Petitions filed on November 12, 2021

Case Numbers – IPR2022-00100 and IPR2022-00101. Petitions filed on October 28, 2021.

Case Numbers – IPR2022-00051, IPR2022-00052, and IPR2022-00098. Petitions filed on October 27, 2021.

Case Numbers – IPR2021-01575 and IPR2021-01576. Petitions filed on October 1, 2021.

Case Numbers – IPR2021-01299, IPR2021-01300, IPR2021-01345, IPR2021-01346, and IPR2021-01347. Petitions filed on September 7, 2021.

Case Subject Matter – Circuit design, including switching power supply design (e.g., flyback), rectifiers, power factor correction, etc. for lighting and displays using light emitting diodes (LEDs).

Work Performed – Provided expert consulting services, wrote declarations, and was deposed ten times.

Haynes and Boone, LLP (Plano, TX)

Case – *Pure Storage, Inc.* v. Digital Cache, LLC

Case Number – IPR2022-00121. Petition filed on October 29, 2021.

Case Subject Matter – Non-volatile memory (NVM) devices capable of retaining stored data in case of a power failure.

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

Banner Witcoff (Washington, DC)

Case – *SolarEdge Technologies Ltd.* v. Koolbridge Solar, Inc.

Case Numbers – IPR2022-00007, IPR2022-00008, IPR2022-00009, IPR2022-00010, IPR2022-00011, and IPR2022-00012. Petitions filed on October 11, 2021.

Case Numbers – IPR2022-00013, IPR2022-00014, and IPR2022-00015. Petitions filed on October 8, 2021.

Case Subject Matter – DC-to-AC converters using full-bridges, multi-level conversion for power systems, and other electronics for harvesting solar energy.

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

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

Case – *Samsung Electronics Co., Ltd.* v. LED Wafer Solutions LLC
Case Number – IPR2021-01554. Petition filed on September 20, 2021.
Case Number – IPR2021-01526. Petition filed on September 10, 2021.
Case Number – IPR2021-01506. Petition filed on September 7, 2021.
Case Number – IPR2021-01491. Petition filed on September 3, 2021.
Case Subject Matter – Packaging of light emitting diodes (LEDs).
Work Performed – Provided expert consulting services and wrote declarations.

Paul Hastings, LLC (Washington, DC)

Case – Ex Parte Reexamination
Case Number – 90/014,846. Request filed on August 30, 2021.
Case Subject Matter – Wireless power transmission and ways to wirelessly charge and/or discharge a battery.
Work Performed – Provided expert consulting services and wrote declaration.

Jones Day (San Diego, CA and Pittsburgh, PA)

Case – *SOLiD, Inc.* v. CommScope Technologies LLC
Case Numbers – IPR2021-01390, IPR2021-01391, IPR2021-01392, IPR2021-01393, and IPR2021-01394. Petitions filed on August 12, 2021.
Case Subject Matter – Digital antenna system that enables extension of radio frequency (RF) analog signals from base stations to areas (e.g., inside of buildings) where access to such signals is inhibited.
Work Performed – Provided expert consulting services for inter partes reviews and wrote declaration.

Unified Patents, LLC (Washington, DC)

Case – Ex Parte Reexamination
Case Number – 90/019,015. Request filed on July 20, 2021.
Case Subject Matter – Voltage-controlled oscillator (VCO) temperature compensation.
Work Performed – Provided expert consulting services and wrote declaration.

Winston & Strawn LLP (Dallas, TX and Palo Alto, CA)

Case – *Micron Technology, Inc.; Micron Semiconductor Products, Inc.; Micron Technology Texas LLC* v. Unification Technologies LLC
Case Numbers – IPR2021-00940, IPR2021-00941, and IPR2021-00942. Petitions filed on June 4, 2021.
Case Subject Matter – Solid-State Drive (SSD), flash non-volatile memory management, memory controller operation and addressing.
Work Performed – Provided expert consulting services for inter partes reviews and wrote declarations.

Hill, Kertscher & Wharton, LLP (Atlanta, GA)

Case – Kaijet Technology v. *Sanho Corporation*
Case Number – IPR2021-00886. Petition filed on April 30, 2021.
Case Subject Matter – Port extension apparatus for headphone jack, USB (Universal Serial Bus or Type-C ports), and video ports such as VGA (Video Graphics Array), DVI (Digital Visual Interface), HDMI (High-Definition Multimedia Interface), DP (Display Port), and mini-DP.
Work Performed – Provided expert consulting services for inter partes review, wrote declaration, was deposed.

O'Melveny & Myers LLP (Los Angeles, CA and New York, NY)

Case – Solas OLED LTD. v. *Samsung Electronics Co. LTD.*
Case Number – Texas, ED (Marshall) 2:21-cv-00105. Complaint filed March 22, 2021.
Case Subject Matter – Touch-sensors for gesture recognition and signal processing for capacitive touch displays.
Work Performed – Provided expert consulting services including writing declaration for claim construction.

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) and Texas, WD (Waco) 6:21-cv-00259 (complaint filed March 15, 2021).

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 and wrote expert reports.

Orrick, Herrington & Sutcliffe LLP (Houston, TX, and Irvine, CA)

Case – Fundamental Innovation Systems International LLC v. *Anker Innovations and Fantasia Trading LLC d/b/a Ankerdirect*

Case Number – Delaware, 1:21-cv-00339. Complaint filed on March 5, 2021.

Case Subject Matter – Universal Serial Bus (USB) for charging mobile devices.

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

Orrick, Herrington & Sutcliffe LLP (Houston, TX, Irvine, CA, and Menlo Park, CA)

Case – *TCT Mobile Inc. and TCL Communication, Inc.* v. Fundamental Innovation Systems International LLC

Case Numbers – IPR2021-00597, IPR2021-00598, and IPR2021-00599. Petitions filed on February 26, 2021.

Case Number – IPR2021-00428. Petition filed on January 13, 2021.

Case Number – IPR2021-00410. Petition filed on January 11, 2021.

Case Number – IPR2021-00395. Petition filed on December 31, 2020.

Case Subject Matter – Universal Serial Bus (USB) for charging mobile devices.

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

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

Case – *Samsung, Inc.* v. Pictos Technologies, Inc.

Case Number – IPR2021-00557. Petition filed on February 18, 2021.

Case Number – IPR2021-00436. Petition filed on January 19, 2021.

Case Numbers – IPR2021-00437 and IPR2021-00438. Petitions filed on January 15, 2021.

Case Subject Matter – Solid-state imaging devices including red, green, and blue pixels, data conversion circuits, and interpolation circuits. CMOS imagers including fabrication and design, active pixels, and semiconductor physics.

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

O'Melveny & Myers LLP (San Francisco, CA) and DLA Piper (New York, NY)

Case – Solas OLED Ltd. v. *BOE Technology Group Co. Ltd. and Samsung Electronics*

Case Number – ITC Investigation No. 337-TA-1243. Complaint filed January 5, 2021.

Case Subject Matter – Active matrix OLED display devices and components

Work Performed – Provided expert consulting services, wrote expert reports, was deposed, and testified at trial.

Paul Hastings LLP (Washington, DC)

Case – *Samsung, Inc.* v. Garrity Power Services LLC

Case Number – IPR2021-00389. Petition filed on December 31, 2020.

Case Subject Matter – Power electronics including full-bridge PWM modules for wireless power transmission using magnetic coupling via antennas and transformers. Design of inductors and coils.

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

Morgan, Lewis & Bockius LLP (Palo Alto, CA and Shanghai, CN)

Case – Monolithic Power Systems, Inc. v. *Meraki Integrated Circuit Technology, Inc. and Promate Electronic Company, LTD.*

Case Number – Texas, WD (Waco) 6:20-cv-00876. Complaint filed on December 24, 2020.

Case Subject Matter – Design of switching power supplies including synchronous rectification.

Work Performed – Provided expert consulting services including declaration for claim construction, trade secret analysis and declaration, and Markman tutorial.

Winston & Strawn LLP (Dallas, TX and Palo Alto, CA)

Case – *Micron Technology, Inc.; Micron Semiconductor Products, Inc.; Micron Technology Texas LLC; Dell Technologies Inc.; Dell Inc.; and HP Inc.* v. Unification Technologies LLC

Case Numbers – IPR2021-00343, IPR2021-00344, and IPR2021-00345. Petitions filed on December 22, 2020.

Case Subject Matter – Solid-State Drive (SSD), flash non-volatile memory management, memory controller operation and addressing.

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

Jones Day (Chicago, IL and Dallas, TX)

Case – WSOU Investments, LLC d/b/a Brazos Licensing and Development v. *Xilinx, Inc.*

Case Numbers – Delaware, 1:20-cv-01231 and Delaware, 1:20-cv-01233. Complaints filed on November 23, 2020 and September 16, 2020.

Case Subject Matter – Controlling power cycles in communication devices and transferring multiple asynchronous clock signals.

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

O'Melveny & Myers LLP (Los Angeles, CA)

Case – Cosemi Technologies, Inc. v. EverPro Technologies, Fibbr Technologies, *Logitech, Inc.*, and Facebook Technologies

Case Number – ITC Investigation No. 337-TA-1233. Complaint filed October 28, 2020.

Case Subject Matter – Data cables, including HDMI, Display Port, and USB Type A, USB Type C and USB Type A/C data cables.

Work Performed – Provided expert consulting services.

Kirkland & Ellis LLP (Boston, MA and New York, NY)

Case – Pictos Technologies, Inc. v. *Samsung Electronics Co., LTD. and Samsung Semiconductor, Inc.*

Case Number – ITC Investigation No. 337-TA-1231. Complaint filed September 25, 2020.

Case Subject Matter – Solid-state imaging devices including red, green, and blue pixels, correction of bad pixels, data conversion circuits, and interpolation circuits. CMOS imagers including fabrication and design, active pixels, and semiconductor physics.

Work Performed – Provided expert consulting services and wrote expert report.

Orrick, Herrington & Sutcliffe LLP (Houston, TX, Irvine, CA, and Menlo Park, CA)

Case – Fundamental Innovation Systems International LLC v. *TCT Mobile Inc. and TCL Communication, Inc.*

Case Number – Delaware, 1:20-cv-00552. Complaint filed on September 11, 2020.

Case Subject Matter – Universal Serial Bus (USB) for charging mobile devices.

Work Performed – Provided expert consulting services including writing declarations, expert report on invalidity, and was deposed.

Walters Wilson LLP (Redwood City, CA)

Case – *Western Digital Corporation and SanDisk, LLC* v. Martin Kuster

Case Numbers – IPR2020-01410 and IPR2020-01411. Petitions filed on August 3, 2020.

Case Subject Matter – Computer connectors such as universal serial bus (USB) that connect to peripheral devices such as mice, keyboards, displays, printers, external storage, etc.

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

O'Melveny & Myers LLP (Los Angeles, CA)

Case – *Advanced Micro Devices, Inc.* v. Monterey Research, LLC

Case Number – IPR2020-01315. Petition filed on July 16, 2020.

Case Number – IPR2020-00985. Petition filed on May 26, 2020.

Case Subject Matter – Reading and writing to semiconductor memory such as SRAM and double data rate (DDR) DRAM. Buffer circuits with variable current supplies for controlling the rise and fall times of output signals.

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

Winston & Strawn LLP (Dallas, TX and Palo Alto, CA)

Case – Unification Technologies LLC v. *Micron Technology, Inc.; Micron Semiconductor Products, Inc.; Micron Technology Texas LLC*

Case Number – Texas, WD (Waco) 6:20-cv-00500. Complaint filed June 5, 2020.

Case Subject Matter – Solid-State Drive (SSD), flash non-volatile memory management, memory controller operation and addressing.

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

Ari Law, P.C. (Palo Alto, CA) and Hill, Kertscher & Wharton, LLP (Atlanta, GA)

Case – *Sanho Corporation* v. Kaijet Technology, Magic Control Technology, and Star View Global

Case Numbers – Georgia, ND (Atlanta) 1:18-cv-05385 (third amended complaint filed November 14, 2019) and Georgia, ND (Atlanta) 1:20-cv-02150 (filed May 19, 2020).

Case Subject Matter – Port extension apparatus for headphone jack, USB (Universal Serial Bus or Type-C ports), and video ports such as VGA (Video Graphics Array), DVI (Digital Visual Interface), HDMI (High-Definition Multimedia Interface), DP (Display Port), and mini-DP.

Work Performed – Provided expert consulting services, wrote declaration for claim construction, and expert reports. Was deposed and testified at trial.

Orrick, Herrington & Sutcliffe LLP (Houston, TX, Irvine, CA, and Menlo Park, CA)

Case – Fundamental Innovation Systems International LLC v. *Coolpad Group Limited, Coolpad Technologies, Inc., and Yulong Computer Telecommunication Scientific Co. Ltd.*

Case Number – Texas, ED (Marshall) 2:20-cv-00117. Complaint filed on April 23, 2020.

Case Subject Matter – Universal Serial Bus (USB) for charging mobile devices.

Work Performed – Provided expert consulting services including writing declaration for claim construction.

Pillsbury Winthrop Shaw Pittman LLP (San Francisco, CA and Shanghai, China)

Case – *SMIC, Americas* v. Innovative Foundry Technologies LLC

Case Numbers – IPR2020-00837 and IPR2020-00839. Petitions filed on April 14, 2020.

Case Subject Matter – Methods of manufacturing a semiconductor component, such as a short-channel MOS device, including forming graded-junctions using spacers along the sidewalls of a transistor's gate.

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

Russ August & Kabat (Los Angeles, CA)

Case – *Oyster Optics, LLC* v. Ciena Corporation

Case Number – California, ND (Oakland) 3:20-cv-02354. Complaint filed on April 7, 2020.

Case Subject Matter – Fiber optic telecommunication systems.

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

Russ August & Kabat (Los Angeles, CA)

Case – Seoul Semiconductor Co., Ltd. v. *Document Security Systems, Inc.*
Case Number – IPR2020-00938. Petition filed on May 18, 2020.
Case – Nichia Corporation v. *Document Security Systems, Inc.*
Case Number – IPR2020-00908. Petition filed on May 18, 2020.
Case – Cree, Inc. v. *Document Security Systems, Inc.*
Case Number – IPR2020-00557. Petition filed on February 11, 2020.
Case Subject Matter – Light emitting diodes (LEDs) as a light source, extraction of light.
Work Performed – Provided expert consulting services, wrote declaration for inter partes reviews, and was deposed three times.

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 Numbers – IPR2019-00858, IPR2019-00859, IPR2019-00860, IPR2019-00861, IPR2019-00862, and IPR2019-00863. Petitions filed on March 22, 2019.
Case Subject Matter – Wireless power transmission using magnetic coupling via antennas and transformers. Design of inductors and coils.
Work Performed – Provided expert consulting services and wrote declarations for post grant and inter partes reviews. Was deposed five times.

DLA Piper (East Palo Alto, CA)

Case – Invensas Corporation and Tessera Advanced Technologies, Inc. v. *NVIDIA Corporation*
Case Number – Delaware, 1:19-cv-00861. Complaint filed on May 8, 2019.
Case Subject Matter – Reference voltage circuits (programmable bandgaps) having a substantially zero temperature coefficient using bipolar and MOS transistors.
Work Performed – Provided expert consulting services.

Irell & Manella LLP (Los Angeles, CA)

Case – *VLSI Technology LLC* v. Intel Corporation
Case Number – Texas, WD (Waco) 6:19-cv-00256. Complaint filed on April 11, 2019.
Case Subject Matter – Static Random Access Memory (SRAM) having a variable power supply using charge-sharing capacitors, methods for designing digital systems, and hardware managed interrupt control.
Work Performed – Provided expert consulting services, wrote expert reports, declaration, and was deposed.

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 four 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.

Morrison & Foerster LLP (San Francisco, CA) and Schwabe, Williamson & Wyatt PC (Portland, OR)

Case – Steven A.W. de Jaray, Perienne de Jaray, and Darrell R. Oswald v. *Lattice Semiconductor Corporation*

Case Number – Oregon, Circuit Court (Multnomah), 3:19-cv-00086. Complaint filed on January 17, 2019.

Case Subject Matter – Export controlled integrated circuits in various packages. Programmable logic devices (PLDs).

Work Performed – Provided expert consulting services. wrote expert reports, was deposed, and testified at trial.

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.

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 (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., PCI Express (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 (OFDM, 802.11, Bluetooth, 3G, 4G, etc.).

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 using DDR DRAM (double data rate DRAM) 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 integrated circuits and processing components thereof. Communications, e.g., PCI Express (PCIe), USB, Firewire (IEEE-1394), between two processing nodes.

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 using DDR DRAM (double data rate DRAM) 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. Communications, e.g., PCI Express (PCIe), USB, Firewire (IEEE-1394), between two processing nodes.

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 in capacitive filters for filtering noise on printed circuit boards (PCBs), 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 (phase-change memory [PCM] using chalcogenide materials and programmable contacts in cross-point arrays) 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 using DDR DRAM, 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. JJL 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, such as I/O buffers, 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 (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, ND 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. *Silergy 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 Microelectronics, 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*, *TPF*, *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 (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 and power management 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.

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