



Exponent®

Engineering & Scientific Consulting

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Professional Profile

Dr. Huang is the Head of Exponent's Asia Offices. He has worked in Europe, Asia and North America advising both industrial and legal clients in matters pertaining to product liability, intellectual property, trade secrets, technical due diligence, ITC investigations and commercial/insurance dispute resolution. He also specializes in conducting consumer product recall investigations, including those involving CPSC FDA and RAPEX frameworks, and liaising between proactive product testing, risk management, safety, quality, reliability and beta testing programs for consumer product companies and manufacturing facilities around the world.

Dr. Huang has extensive hands-on experience leading complex technical investigation and performing scientific and engineering analysis and testing in applications that includes the following:

- Battery technologies
- Consumer product manufacturing processes
- Mobile devices and manufacturing processes
- Electric Vehicles and e-mobility applications
- Automotive and drone electronics and event data recorders
- IoT and Smart Home appliances
- Wearable devices and technologies
- AR/VR technologies
- Energy storage systems (ESS), solar panel, inverters, and green energy technologies
- Secure payment devices
- Biomedical and implantable devices
- Power adapters and power supplies
- Printed circuit boards
- Consumer products (consumables, textile, food and chemical)
- Industrial manufacturing equipment and machinery

Dr. Huang is also skilled in prototype validation and development, including hardware, software, and embedded systems. He has developed implantable Parylene MEMS platforms for retinal and neural prosthetic, pressure sensors and lab-on-a-chip applications, built custom air quality and environmental monitoring equipment, and developed algorithm for agricultural asset management.

Dr. Huang currently serves as a voting member on IEC and UL standards development committees and

has presented in numerous IEEE, Insurance Adjuster and technical conferences. He has taught undergraduate and graduate level courses in areas such as Computer Instrument Design, Introduction to Sensors and Actuators, VLSI and ULSI Technology, and MEMS Technology and Devices.

Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, California Institute of Technology (Caltech), 2011

M.S., Electrical Engineering, California Institute of Technology (Caltech), 2006

B.S., Electrical Engineering, Cornell University, 2005

Licenses and Certifications

Licensed Professional Electrical Engineer, California, #20293

ISO 9001:2015 Lead Auditor

Certified Fire and Explosion Investigator (CFEI) in accordance with the National Association of Fire Investigators (NAFI) National Certification Board

Crash Data Retrieval (CDR) Technician Levels 1 and 2

Prior Experience

Research Assistant, Caltech Micromachining Laboratory, California Institute of Technology, 2005-2010

Intern, Hardware System Lab, Palo Alto Research Center, 2005

Intern, Corporate Marketing, Applied Materials, 2004

Professional Affiliations

Member of IEEE

Languages

Mandarin Chinese

Patents

U.S. Patent: Pocket-enabled chip assembly for implantable devices WO2010090706 A2 (Huang R, Tai YC).

Publications

Zhang Q, Sinenian N, Huang R. "Investigations on Electrolytic Capacitors to Improve Reliability under Assembly-Level Impact Conditions." 2019 20th International Conference on Electronic Packaging Technology (ICEPT). IEEE, 2019.

McNulty J, Trenkle J, Huang R, Brown E. The role of tin plating in arc-induced damage of power supplies.

Materials Science & Technology 2015.

Huang R, Sorini A, McNulty J. Quantitative solder inspection with computed tomography. 2014 ISPCE, San Jose, CA, May 2014.

Huang R, Nilsson S. Fuse selection criteria for safety applications. 2012 ISPCE, Portland, OR, November 2012.

Crane S, Huang R, Kislitsyn M. Root cause analysis of failed capacitors and the capacitor plague. 2012 MS&T, Pittsburgh, PA, October 2012.

Chang J, Huang R, Tai YC. High-density IC chip integration with Parylene pocket. 2011 IEEE NEMS Conference, Kaohsiung, Taiwan, 2011.

Chang J, Huang R, Tai YC. High-density 256-channel chip integration with flexible Parylene pocket. Transducer '11, Beijing, China, June 5-9, 2011.

Huang R, Tai YC. Flexible parylene-based 3-D coiled cable. 5th IEEE International Conference on Nano/Micro Engineered and Molecular Systems, Xiamen, China, 2010.

Huang R, Tai YC. Parylene to silicon adhesion enhancement. 15th International Conference on Solid-State Sensors, Actuators and Microsystems, Denver, CO, 2009.

Huang R, Tai YC. Parylene-pocket chip integration. 22nd IEEE International Conference on Micro Electro Mechanical Systems, Sorrento, Italy, 2009.

Huang R, Pang C, Tai YC, Emken J, Ustun C, Andersen RA, Burdick JW. Integrated parylene-cabled silicon probes for neural prosthetics. 21st IEEE International Conference on Micro Electro Mechanical Systems, Tucson, AZ, 2008.

Huang R, Pang C, Tai YC, Emken J, Ustun C, Andersen RA. Parylene coated silicon probes for neural prosthesis. 3rd IEEE International Conference on Nano/Micro Engineered and Molecular Systems, Sanya, China, 2008.

Presentations

Huang R. Sensor Application Reliability and Data Management, Biological + Chemical Sensors Summit, San Diego, CA, December 2017.

Huang R. Lightning Losses to Equipment, PLRB Regional Conference, Riverside, CA and New Orleans, LA, 2017.

Huang R. Sensor data reliability and sensor risk management. Biological + Chemical Sensors Summit, La Jolla, CA, December 2016.

Huang R. Wearable products development: testing to minimize product liability and safety risks. Wearable TechCon, San Jose, CA, July 2016.

Huang R, Klopp R, McGoran B. Reliability of wearable data. Sports and Fitness Industry Association, May 2016.

Huang R. Electrical loss investigations and resolution. PLRB Regional Conference, Sacramento, CA, St. Louis, MO and Richmond, Virginia, 2016.

Huang R, et al. Failure analysis of electronic packaging. ASME Professional Development Seminar,

Santa Clara, CA, April 2014.

Huang R, Tai YC. Chip integration with flexible parylene pocket. 5th International Conference on Microtechnologies in Medicine and Biology, Quebec City, Canada, 2009.

Rizzuto DS, Musallam S, Pang C, Huang R, Tai YC, Andersen RA. The Caltech Brain-Machine interface platform. Society for Neuroscience, Atlanta, Georgia, 2006.

Project Experience

Product Liability (Reliability, Quality, Safety, Performance, Compliance Risk) Assessment

- Li-ion Battery cell and battery systems
 - Portable, wearable, consumer electronics applications
 - Large format cells and systems for automotive and aerospace applications
- Mobile Devices
- Wearable devices (Wrist, VR/AR, fabric)
- Robot and autonomous vehicle
- Printed Circuit Boards
- Magnetic field, chemical and environmental exposure
- Safety mechanism and equipment
- Circuit Components
 - Fuses
 - Power FET and Diodes
 - Vibrating Motors
 - Camera and Len Modules
 - LEDs
 - Connectors, interconnectors, wirings and cables
 - RFID and wireless communication
 - BGA/Solder
- Smart home appliances (IoT) and household appliances
- Security cameras and conference camera
- Vehicle electronics; electrical vehicle, bike and scooters; drone technologies
- Computer and Data Center Servers
 - Multi-layer printed circuit boards propagation failure
 - Connector, wiring, interconnects
 - Safety mechanism (fuses, circuit breakers)
 - Power suppliers and systems
- Solar Panels, equipment and infrastructures
- Biomedical Devices
- Implantable devices

- Surgical tools
- Glucose monitor
- Near field communication
- Monitoring equipment

Technology Due Diligence and Design Review

- MEMS and Integrated Circuit (silicon) manufacturing technology
- GaN display technology
- Memory (SRAM, DRAM, Flash, EEPROM)
- Semiconductor manufacturing technology
 - Chemical vapor deposition systems (CVD)
 - Etching systems (RIE)
 - Lithography and metallization systems (Sputtering, E-beam, etc)
- Vehicle electronics
 - ACM memory integrity analysis
 - Vehicle Event data recorders
 - ECU embedded systems
 - Emission system control
- Battery management systems
- Power adapter and supplies
- Voice activated assistance technology
- GPS tracking technology
- Bluetooth and short range communication technologies
- Home security and access control systems
- Environmental monitoring devices

Intellectual Property (infringement analysis, testing, claim chart, prior art) Assessment

- Memory chip fabrication technology
- Web conferencing software package
- Wireless Networking technology
- Integrated chip architecture and packaging technology
- Facial recognition
- Medical device electronics
- Home appliances and robotics
- Electrical grid and energy storage systems