

Exponent®
Engineering & Scientific Consulting

Daniel Vasquez, Ph.D., CFEI

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Professional Profile

Dr. Vasquez has a diverse area of expertise in electrical engineering and computer science. His research includes magnetic materials, sensor and actuator design, and algorithms and data structures. He is an expert in manufacturing, product safety, incident inspections, and failure analysis. He has advised corporate leaders and regulators in various industries including consumer electronics, consumer appliances, medical devices, electric vehicles, precision agriculture, and food processing.

Dr. Vasquez has significant experience of failure analysis of consumer electronics, consumer appliance, medical devices, and mobility devices. Analysis includes MLB and other electrical system failures, battery related failures, analysis on sensor and actuator component failures, analysis of noise related failures, analysis of failures due to corrosion, fracture or delamination.

Dr. Vasquez has performed manufacturing and safety audits at MEMS and semiconductor processing and packaging plants, consumer electronics and consumer appliance manufacturing, electric vehicle assembly, battery and pack manufacturing, and wood treatment and flooring manufacturing.

Dr. Vasquez has performed on-site fire and explosion investigations across Asia including China, Japan, Malaysia, Australia, New Zeeland, and India. These include post thermal runaway investigations of micro mobility devices, 2-wheel and 4-wheel electric vehicles, consumer electronics, and consumer appliances. He has also been involved in post fire and post explosion investigations at residential sites and manufacturing and device test facilities.

Dr. Vasquez has significant experience in ESD protection design and testing at both the component and device level. He has experience in modeling for both system level (IEC EN 61000-4), and device level protection (HBM, CDM). He has developed ESD protection solutions in consumer electronics and accessories, medical devices, and LED modules. He has also performed product EMI failure analysis in precision sensors for heavy equipment manufacturers.

Dr. Vasquez has developed technologies used in MEMS magnetometers including patented work in anisotropic magnetoresistive (AMR) MEMS magnetometers. He has a strong background in MEMS and semiconductor manufacturing processes. He has worked as a technical expert in semiconductor manufacturing trade-secret disputes and disputes related to best design practices for resonator circuits.

Dr. Vasquez has experience in product development for inertial sensors including 6 DOF gyro-compensated tilt sensors and 9 DOF inertial measurement units (IMU) and attitude heading and reference systems (AHRS).

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Academic Credentials & Professional Honors

Ph.D., Electrical Engineering, University of California, Los Angeles (UCLA), 2007

M.S., Electrical Engineering, University of California, Los Angeles (UCLA), 2004

B.S., Electrical Engineering / Computer Engineering, University of California, Los Angeles (UCLA), 2001

Licenses and Certifications

Certified Fire and Explosion Investigator (CFEI)

Prior Experience

MEMSIC, Milpitas, Strategic Marketing Manager (Inertial and Navigation Systems), 2013-2015

Shocking Technologies, San Jose, Applications Group Manager, 2009-2013

University of California, Berkeley, Postdoctoral Researcher, 2007-2009

Technical Consultant, Los Angeles, CA, 2007-2009

TRW Space and Electronics, System Engineer, 2001-2002

Professional Affiliations

Institute of Electrical and Electronics Engineers (IEEE)

National Association of Fire Investigators (NAFI)

Patents

Patent US20110211319: Electric Discharge Protection for Surface Mounted and Embedded Components, Feb. 2011, Inventors: Lex Kosowsky, Robert Fleming, Bhret Graydon, Daniel Vasquez.

Patent US 13/096,860: Embedded Protection Against Spurious Electrical Events, April 2011, Inventors: Lex Kosowsky, Robert Fleming, Bhret Graydon, Daniel Vasquez.

Patent US 13/115,068: Circuit Element Comprising Ferroic Materials, May 2011, Inventors: Robert Fleming, Bhret Graydon, Daniel Vasquez, Junjun Wu, Farhad Razavi.

Patent US 20120200963 A1: System and Method for Protecting a Computing Device using VSD Material, and Method for Designing Same, Nov. 2011, Inventors: Daniel Vasquez, Lex Kosowsky.

Patent US20120211773 A1: Light-Emitting Devices Comprising Non-Linear Electrically Protected Material, Jan. 2012, Inventors: Robert Fleming, Daniel Vasquez, Michael Glickman.

Patent WO 2013044096 A3: Vertical Switching Formations for ESD Protection, Sept. 2012, Inventors: Robert Fleming, Michael Glickman, Bhret Graydon, Junjun Wu, Daniel Vasquez.

Patent WO 2013070806 A1: Voltage Switchable Dielectric Material Formations and Supporting Impedance Elements for ESD Protection, Nov. 2012, Inventors: Joan Vrtis, Daniel Vasquez, Robert Fleming, Lex Kosowsky.

Patent US 14/547,707: Method and Apparatus for Detecting Magnetic Saturation in AMR Sensors, Filed Nov 19 2014, Inventors: Daniel Vasquez, Yongyao Cai, Shuo Gu, James Fennelly

Publications

Vasquez DJ, Judy JW. Zero-power magnetometer with remote optical interrogation. 17th IEEE International Conference on Micro Electro Mechanical Systems, MEMS 2004, Maastricht, The Netherlands, January 25-29, 2004.

Vasquez DJ, Judy JW. Optically-interrogated zero-power MEMS magnetometer. Journal of Microelectromechanical Systems 2007 April; 16(2):336-343.

Vasquez DJ, Judy JW. Scaling magnetic actuators beyond the single-domain limit. 1st IEEE International Conference on Nano/Micro Engineered and Molecular Systems, NEMS 2006, Zhuhai, China, January 18-21, 2006.

Lee SA, Vasquez DJ, Bergsneider M, Judy JW. Magnetic microactuators for MEMS-enabled ventricular catheters for hydrocephalus. 28th International Conference of the Engineering in Medicine and Biology Society, EMBS 2006, New York City, NY, August 30-September 3, 2006.

Vasquez DJ, Judy JW. Flexure-based nanomagnetic actuators and their ultimate scaling limits. 21st IEEE International Conference on Micro Electro Mechanical Systems, MEMS 2008, Tucson, AZ, January 13-17, 2008.

Tu Yu-Hui, Yang Li-Jie, Daniel Vasquez. Novel Insight into Finite Element Modeling for Failure Analysis and Engineering Solution. The 19th China CAE Annual Conference, July 24th, 2023

Project Experience

Selected Fire and Explosion Investigations:

Post thermal runaway investigation of multiple 2-wheel electric vehicles in India – analyzed physical evidence including vehicle and battery packs, vehicle telemetry collected both prior to incident and at time of incident, drive conditions, storage conditions, and environmental conditions at time of incident.

Post thermal runaway investigation of full-sized passenger EV in China. Included site investigation of charge station and physical analysis of vehicle and battery pack.

Post explosion investigation at food processing facility. Completed site investigation, collected evidence for further analysis at our labs, analysis of video and sensor data collected at the factory both before and during the time of the incident, analyzed operator procedures, and removal of safety measures that may have contributed to severity of the incident.

Multiple residential structure fire investigations in China. Performed on-site inspection, determined likely fire origin, and analyzed the ignition and fuel sources in the region of likely origin. Findings were discussed with local fire department.

Analysis of post fire inspection at Taiwan hospital. Performed on-site inspection, and physical inspection of suspected incident devices.

Analysis of multiple post thermal incident consumer electronics devices in China, Japan, Malaysia, Australia, and New Zeeland, and Germany. In each location, I found labs and equipment (CT, optical microscopy, SEM) that could be used locally to facilitate the inspections.

Post thermal runaway inspection of consumer electronics device that went into thermal runaway during manufacturing. Inspection was performed at the factory, evidence was taken back to Exponent labs for further analysis and inspection.

Post thermal runaway inspection of electric scooter device that went into thermal runaway during reliability testing at the factory. Inspection was performed at the factory, evidence was taken back to Exponent labs for further analysis and inspection.

Selected Factory Audits:

Audit of multiple MEMs sensor packaging facilities in Taiwan.

Audit of 2-wheel electric vehicle manufacturing facility in India.

Audit of 2-wheel electric vehicle service center and labs.

Audit of multiple battery pack manufacturing facilities in mainland China.

Audit of multiple consumer electronics manufacturing facilities in China.

Audit of manufacturing facility used for wireless communication controller for e-scooters.

Audit of bicycle manufacturer in Taiwan.

Audit of metal bending and stamping facility in mainland China.

Audit of consumer appliance heater manufacturer in mainland China.