



**KIMBERLY K. CAMERON, Ph.D., P.E.**  
**PRINCIPAL**

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Dr. Kimberly Cameron is a Principal for ESi in the Mechanics and Materials practice. She specializes in design, failure analysis, and risk assessments of engineering structures and components. She has conducted hundreds of investigations on a wide variety of engineering structures, from miniature biomedical devices to large scale process equipment. She has also taught classes for engineers preparing to take the fundamentals of engineering exam and the professional engineering licensing examination in both Civil Engineering and Mechanical Engineering.

Dr. Cameron has performed design and damage tolerance evaluations on biomedical devices, pipelines, consumer electronics, consumer products, aircraft structures, industrial machinery, power-plant components, solar panels, pressure vessels, and vehicle components. Dr. Cameron also has extensive experience evaluating pipe-soil interactions, mechanical and welded joints, welding procedures, in-line inspection tools, regulatory compliance, and the overall integrity of pipeline systems. She has evaluated operating and maintenance procedures, control room management programs and pipeline leak detection plans. The common thread in each of Dr. Cameron's investigations is the application of the fundamentals of metallurgy, materials science, engineering physics, computational mathematics, and engineering mechanics to help understand and solve complex problems.

Dr. Cameron is a registered patent agent, with experience in both the patent application process, as well as intellectual property disputes. In particular, she has experience in biomedical, automotive, electrical, mechanical, and materials science fields and has provided numerous invalidity and infringement reports. She has testified in federal and state court as well as in front of the ITC and in arbitration.

**Areas of Specialization**

Metallurgy	Product Design	Oil & Gas
Plastics & Composites	Structural Engineering	Energy & Power
Corrosion	Product Recalls	Biomedical Devices
Materials Selection	Root Cause Investigations	Consumer Products & Electronics
Mechanical Engineering	Regulatory Compliance	Automotive & Aviation
Intellectual Property Matters	Failure Analysis	Electrical Equipment

**Education**

Ph.D. Mechanical Engineering, minor Materials Science & Engineering, Stanford University, CA, 2004

M.S. Mechanical Engineering, Stanford University, CA, 2000

B.S.E. Mechanical and Aerospace Engineering. Certificates: Engineering Physics, Applied & Computational Mathematics, Materials Science & Engineering, Woodrow Wilson School of Public Policy & International Affairs, Princeton University, NJ, 1999



## **Licensed Professional Engineer (P.E.)**

Mechanical Engineer, State of California .....License No. 33732

Metallurgical Engineer, State of California.....License No. 1969

## **Professional Affiliations/Honors**

### **American Society of Mechanical Engineers**

Member

### **TMS**

Member

### **Department of Defense**

Fellowship

### **National Science Foundation**

Fellowship

### **Lucent Technologies**

Graduate Fellowship

## **Positions Held**

### **Engineering Systems Inc., Sunnyvale, California**

Principal, Mechanics, 2011 – Present

### **Exponent, Menlo Park, California**

Senior Engineer, Mechanics & Metallurgy, 2004 – 2011

## **Publications/Presentations**

“Crack Growth and Arrest in Steam Turbine Casings,” EPRI 3002003504, EPRI, Palo Alto, CA, December 2014.

M. H. Anderson, D. Cislo, J. Saavedra, and **K. Cameron**, Why International Inventors Might Want to Consider Filing Their First Patent Application at the United States Patent Office & the Convergence of Patent Harmonization and E-Commerce, 30 Santa Clara High Tech. L.J. 555 (2014).

“Increasing Reliability of Small Punch Fracture Toughness Testing with Acoustic Emission Monitoring,” Proceedings, 3rd International Conference on Small Sample Test Techniques, September 2014. (with D. Purdy and J. Foulds).

“Small Punch Fracture Toughness Evaluation of Combustion Turbine Materials,” EPRI 3002001468, EPRI, Palo Alto, CA, December 2013. (with D. Purdy, J. Foulds and J. Rodgers).

- “Small Punch Testing for Fracture Toughness” by J. Foulds, J. Rodgers, **K. Cameron** and P. Sullivan, EPRI, Palo Alto, CA: 2013. 3002000250.
- “The Effect of Low Sulfur Content on the Weldability of Linepipe Steel” by **K. Cameron** and A.M. Pettinger, Proceedings of the 9th International Pipeline Conference, September 2012.
- “Effectiveness of Hydrostatic Testing for High Strength Pipe Material” by **K.K. Cameron** & A.M. Pettinger, Proceedings, 8th International Pipeline Conference, October 2010.
- “Axial Loads from Soil Movement Challenge Pipeline Integrity” by **K.K. Cameron** & A.M. Pettinger, PipeLine Gas Technology, November 2009.
- “Assessing Pipeline Integrity Using Fracture Mechanics and Currently Available Inspections Tools” by **K.K. Cameron** & A.M. Pettinger, Journal of Pipeline Engineering, October 2009.
- “Assessing Pipeline Integrity Using Fracture Mechanics and Currently Available Inspections Tools” by **K.K. Cameron** & A.M. Pettinger, Proceedings, 2008 Evaluation and Rehabilitation of Pipelines Conference, Clarion Technical Conferences, Scientific Surveys Ltd., Prague, Czech Republic, October 2008.
- “Fatigue Damage in Bulk Metallic Glass I: Simulation” by **K.K. Cameron** & R. Dauskardt, Scripta Materialia 2006; 54(3):349–353.
- “Fundamentals of Engineering in a Flash” by **K.K. Cameron**, PPI, August 2006.
- “Transmission Electron Microscopy Structure and Platinum-like Temperature Coefficient of Resistance in a Ruthenate-Based Thick Film Resistor with Copper Oxide” by **K.K. Cameron**, G. Crosbie, J. Jiang, & X. Pan, J. Appl. Phys. 2000; 88:1124–1128.

## Selected Project Experience

### Medical Devices

Failure analysis, design analysis, material selection, mechanical testing, finite element analysis, fatigue and fracture evaluation, and development of various implantable medical devices including cardiovascular implants (heart valves, stents, catheters, pacemakers), orthopedic implants (screws, plates, pins, hip implants, spinal implants), cranial implants, etc.

Design and failure analysis of various fluid and drug delivery systems including implantable pumps, drug eluting stents, syringes, patches, microneedles, CPAP machines, anesthesia machines, insulin and other drug delivery pumps, balloon respirators, etc.

Design and failure analysis of other types of medical devices including surgical tools, scooters, hospital beds, physical therapy equipment, etc.

Performed analyses to support FDA submissions.

## **Pipelines**

Evaluated the design, pipeline integrity management program, in-line inspection tools, leak detection systems, control room management and operation and maintenance practices, including control room management of both liquid and gas pipeline systems under both 49 CFR 195 and 192.

Evaluated pipeline construction practices of various pipeline systems and performed pipeline failure investigations after various landslide events.

Assisted the Inter-American Development Bank with a pipeline integrity study and with the supervision of the implementation of a pipeline integrity management program for a pipeline operator. The investigation integrated geotechnical site investigations, metallurgical investigations, in-line inspection data, external pipe inspection data, and fracture mechanics to perform a root cause analysis.

Evaluated welding procedures and determined the effect of welding defects and other construction factors on pipeline integrity.

Investigated pipe soil interactions occurring during hydrostatic testing of pipelines and the evaluation of pipeline ruptures and leaks at welded joints.

Investigated the operation and maintenance procedures of pipelines that are located in close proximity to other infrastructure (electrical equipment, coal mines, water distribution, other pipelines, etc.)

Failure analysis of various insulated steel oil and water pipeline systems, including behavior of the polyurethane foam and jacket materials.

Design evaluation and failure analyses of pipe couplings and fittings, including finite element analyses.

Performed design and failure analyses of various gas distribution systems made of polyethylene and steel pipe, including the analysis of pipe-soil interactions, failure analysis of various components, evaluation of welding and construction practices, and performance evaluation of compression couplings.

Performed failure analysis and finite element analyses of various water distribution systems including various fire sprinkler systems, water supply systems and couplings, and a ten foot wide water main.

Retained as an expert for the United States Patent and Trademark Office in the evaluation of a patent claim dispute relating to large diameter pipes.

## **Energy & Power**

Assisted the general contractor of a nuclear power plant where a large pipe of the primary circuit was vibrating excessively, significantly reducing the allowable power production.

Evaluated the design of a hydrogenerator system. Performed a finite element analysis and fatigue analysis of the rotors, thrust bridge, and head cover to assess the design.

Developed a three-dimensional model of the control rod drive mechanism nozzle penetration in a nuclear reactor pressure vessel head. Evaluated welding-induced residual and operational stresses.

Evaluated the design of various pumps, rotors, bearings, seals and insulation systems.

Performed stress analysis of various solar panel system components and assisted in design changes to meet standardized safety testing.

Performed a stress analysis to evaluate the effects of tightening torques on a ton container valve.

Performed numerical simulation and small punch testing to evaluate fracture toughness and tensile behavior of miniature surface samples from a steam turbine rotor bore and from medical device plastics.

### **Consumer Products and Electronics**

Developed testing protocols, and conducted failure analyses and design reviews for various consumer electronic devices and accessories, electrical connectors, power cords, and jacket sleeves.

Evaluated the material selection and performance for various components of several consumer electronic devices including phones, tablets, and computers.

Design and failure analyses of various electronic components.

Design evaluation and stress analysis of various consumer products, including washing machines, refrigerators, baby chairs and other child containment products, hand tools, security and display systems, microwave ovens, coffee machines, exercise machines, etc.

### **Automotive and Aviation**

Performed fracture and fatigue analyses of aircraft structures.

Performed welding and structural evaluation of various automotive components including semitrailers.

Investigated the manufacturing procedures of electromagnetic latches used in aerospace applications.

Evaluated the design of a diode on a solar panel and various other components for space applications.

Performed fitness for service and design evaluations for welds in various applications, including in fuel storage tanks, process reactor vessels, scaffoldings, semitrailers, and other automotive components.