

# DAVID XU, PH.D. P.E.

Phone: (510) 859-4558 Email: DavidXu@BearInc.com

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## EDUCATION

2012	<i>University of California, Berkeley</i>	Ph.D.
	Materials Science and Engineering, College of Engineering	
2009	<i>University of California, Berkeley</i>	M.S.
	Materials Science and Engineering, College of Engineering	
2007	<i>University of California, Berkeley</i>	Bachelor of Science
	Materials Science and Engineering, College of Engineering	

## LICENSURE

2016	Professional Electrical Engineer, California E21593
2014	Professional Chemical Engineer, California CH6689
2012	Professional Mechanical Engineer, California M36372

## SELECTED INDUSTRY EXPERIENCES & EXPERTISE

Oil & Gas	Maritime	Construction Defect
Electrical	Fire Cause and Origins	Accident Reconstruction
Product Liability	Battery Failures	Fracture Mechanics
Corrosion	Manufacturing Defect	Failure Modes and Effect Analysis
Medical Implant Failures	Microscopy	Chemical Engineering
Textile and Fabrics	Consumer Electronics	Polymeric Materials
Failure Analysis	Finite Element Analysis	Class/Mass Action

## EMPLOYMENT

2007 – Present Principal Engineer, Berkeley Engineering And Research Inc, Berkeley, CA

- Qualified in state and federal courts as expert witness. Gave over hundreds of pre-trial expert testimonies. Also consults with corporations on design and improvements.
- Active research on Lithium-Ion battery and their explosive characteristics. Cases involving electronic cigarettes, laptop batteries, phone batteries and electric automobile batteries.
- Developed techniques for testing fabric and textile for compositional analysis. Performed fire and flame analysis on burnt fabrics.
- Worked on San Bruno Pipeline Explosion on fracture mechanical calculation and fatigue crack growth modeling.
- Worked on Deep Water Horizon litigation on the flow of concrete below seafloor and modeling of flow of the “mud.”
- Worked on GM Key Ignition Switch Litigation on the detailed analysis of the electrical behavior of the SDM module, as well as torque measurement of key switches. Review control system and implemented a design change that prevents ignition neutral lockups.
- Worked on Golden Gate Bridge Suicide Net on material selection and guidance on testing and corrosion analysis.
- Worked on Shop-Vac class action on resolving decade-old litigation on torque and horsepower overrating of electrical motors. Modeling and testing of electrical motors.
- Worked on numerous class action involving electrical analysis of components of consumer products. Worked on automotive seatbelt safety and design; is actively involved in several class actions as expert
- Worked on numerous maritime corrosion analysis cases. Determined and modeled the metal loss rate and interaction with paints.
- Worked on chemical plant safety and explosion investigation. Performed detailed analysis of chemical reaction involved as well as safety remedies.

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- Worked on the investigation of fires, ranging from house fires to wildland fires. Performed materials and heat analysis of products. Modeled heat reaction explosion of household cleaning products.
- Performed FEA of beam structures and used fracture mechanics to develop a model for predicting the temperature behavior of crack initiation. Assessed the repair plans to remove cracks and prevent further growth. Prepared the fracture control plan to prevent future failures.
- Performed detailed studies of chemical-mechanical failures of direct-buried insulated polyurethane pipe systems. Developed models for predicting the thermal heat transfer as well as the lifetime of different components based on existing conditions. Developed compressive creep model of polyurethane through laboratory testing.
- Prepared expert testimony on fracture of the biological spinal implant by calculating biomechanical loads using *in vivo* implant geometry. Also analyzed fracture surface of implants to determine the failure mechanisms.
- Prepared expert testimony for crack propagation in high-pressure underground natural gas pipelines via fatigue cycle counting and crack growth models. Analyzed with FEA of the pipe geometry to obtain stress-intensity-factor along with material testing data to determine growth rates.
- Performed fracture mechanics studies on common household polymeric and metallic pipes and hoses. Assisted in determining the failure mechanisms and remedies.
- Used Scanning Electron Microscope to study fracture surfaces and determine failure mechanisms of various materials from consumer products to industrial equipment. Used XRF for *in situ* elemental measurements. Used 3D Laser Scanner to map out the scene for later CAD analysis.
- Performed compositional analysis of corrosion products and detailed study of different corrosion types of common metals in various environments (household, industrial, biological), as well as biological implants.

2008 Aug – 2009 Sept      Graduate Student Intern, Hitachi Global Storage Technologies Inc, San Jose, CA

- Characterized, analyzed and modeled magnetic thin films using X-Ray Reflectivity and X-Ray Fluorescence. Texture analysis with X-Ray Diffraction. Tool automation by using OriginPro.

## RESEARCH EXPERIENCES

2007 Aug – 2012 Dec      Graduate Research Assistant, University of California at Berkeley, Department of Materials Science and Engineering, **Professor Robert Ritchie**

*Developing life prediction and constitutive law for multi-axial loading of Nitinol*

- Characterized using synchrotron x-ray diffraction to obtain *in situ* texture and strain data of Nitinol samples under both monotonic and fatigue loadings to examine the behavior of microscopic phase transformation of austenite to martensite phases under macroscopic mechanical deformation
- Performed fatigue S/N analysis of Nitinol under loading in torsion and tension using equivalent strain method. Devised new life prediction parameter for better FEA modeling results.
- Developed a new project studying the shearing deformation in Nitinol with Synchrotron radiation by using a novel geometry to induce symmetric planar shear with only one loading axis.
- Analyzed Transmission Electron Micrographs of Nitinol under loading in torsion and tension to compare the deformation and dislocations mechanisms.

2006 January – July      Undergraduate Research Assistant, University of California at Berkeley, Department of Materials Science and Engineering, **Suzuki Research Group**  
*Interlayer diffusion of Complex Magnetic Oxide Thin Film under Pulsed Laser Deposition*

- Deposition of magnetic thin film using Pulsed Laser Deposition. Characterization of thin films using Atomic Force Microscopy, Vibrating Sample Magnetometer, Superconducting Quantum Interference

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Device and Rutherford Backscattering Spectrometry. Analysis of inter-diffusion between crystallographic similar magnetic layers.

- 2005 Sept – December      Undergraduate Research Assistant, Lawrence Berkeley National Laboratory, Physic Division, **Nearby Supernovae Factory**  
*Automated Image Processing for Detection of Supernovae*
- Detection of Supernovae using sophisticated image analysis software under Linux. Scripting of software to automate the detection process.

## PUBLICATIONS

- *Influential Statistical Analysis, or why marketing works*, in publication
- *Case Study: Forensic Evaluation of a Hazardous Household Product*, 2017
- *Unexpected Sources of Household Napalm*, presentation to Society of Forensic Engineers & Scientists on Feb 2016.
- *How Electrical Fire Start*, presentation to The National Association of Subrogation Professionals, Nov 2015
- *Basic Workflow in Forensic engineering*, presentation to The National Association of Subrogation Professionals, Nov 2015
- *3D Scanning and Multi-Body Dynamics*, presentation to Society of Forensic Engineers & Scientists, Oct 2014
- *Characterization of in situ Deformation Texture in Superelastic Nitinol* by **D. Xu**, Doctoral Dissertation, University of California at Berkeley, 2012
- *Fatigue Life-Prediction of Nitinol under Multiaxial Loading* by **D. Xu**, et al. TMS 2012.
- *Fatigue Life-Prediction of Vascular Implants Subjected to Multiaxial Loads* by **D. Xu**, et al. Workshop on Computer Methods for Cardiovascular Devices. FDA, Sept 2011.
- *An Equivalent Strain/Coffin-Manson Approach to Multiaxial Fatigue and Life Prediction in Superelastic Nitinol Medical Devices* by A. Runciman, **D. Xu**, et al., Biomaterials, vol. 32, 2011, pp. 4987-4993.
- *Impact of Thermomechanical Texture on the Superelastic Response of Nitinol Implants* by M. Barney, **D. Xu**, et al., Journal of the Mechanical Behavior of Biomedical Materials, vol. 4 (7), Oct. 2011, pp. 1431-1439.
- *Possibility of Austenite Plasticity in Deformation of Superelastic Nitinol* by **D. Xu**, R. Ritchie, TMS 2011

## TEACHING RESPONSIBILITIES

- 2011 Aug – 2011 Dec      Graduate Student Instructor, University of California at Berkeley, Department of Materials Science and Engineering, **MSE 113/ME 124**, *Mechanical Behavior of Engineering Materials*
- 2009 Aug – 2009 Dec      Graduate Student Reader, University of California at Berkeley, Department of Materials Science and Engineering, **MSE C113/ME C124**, *Mechanical Behavior of Engineering Materials*
- 2008 Aug – 2008 Dec      Graduate Student Instructor, University of California at Berkeley, Department of Materials Science and Engineering, **MSE C113/ME C124**, *Mechanical Behavior of Engineering Materials*
- 2007 Aug – 2007 Dec      Graduate Student Instructor, University of California at Berkeley, Department of Materials Science and Engineering, **Engineering 45**, *Introduction to Engineering*
- 2007 Jan – 2007 Dec      Undergraduate Course Instructor, University of California at Berkeley, Department of Materials Science and Engineering, **MSE 198**, *Corporate Tours*