Curriculum Vitae

David Xu, Ph.D., P.E.
Materials Science and Engineer

Select Industry Experience

- Oil & Gas Industry
- Thermodynamics
- Earthquake Engineering
- Magnetic Materials
- Medical Implants
- Manufacturing
- Maritime
- Structure & Bonding
- Plastics / Metals /Ceramics
- Kinetics
- Defects in Solids
- Electron Microscopy
- Construction
- Structural Dymanics
- Polymers
- Corrosion
- Chemical Properties
- Electronic Materials

Education

Ph.D. in Material Science and Engineering at U.C. Berkeley
M.S. in Material Science and Engineering from U.C. Berkeley
B.S. in Material Science and Engineering from U.C. Berkeley

Work Experience

Since 2009
Berkeley Engineering And Research, Inc., Berkeley, CA

FEA of beam structures and fracture mechanics to develop a model for predicting the temperature behavior of crack initiation. Repair plans to remove cracks and prevent further growth. Fracture control plan to prevent future failures. Chemical-mechanical failures of direct-buried insulated polyurethane pipe systems. Thermal heat transfer as well as lifetime of different components based on existing conditions. Creep model of polyurethane through laboratory testing. Pump failure due to material weakness. Fracture of biological spinal implant by calculating biomechanical loads using *in vivo* implant geometry. Analyzed fracture surface of implants to determine the failure mechanisms. 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. Compositional study of various types of refrigerants. Fracture mechanics studies on common household polymeric and metallic pipes and hoses. Scanning Electron Microscope to study fracture surfaces and determine failure mechanisms of various materials from consumer products to industrial equipment. Performed compositional analysis of corrosion products and detailed study of different corrosion types of common metals in various environments, as well as biological implants.

2008-2009

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.

2005-2007

UC Berkeley, Computer Lab Assistant

Maintained and repaired over 20 computers using self-developed management software. Performed biannual upgrades of computers, networks, printers and scanners. Streamlined the user sign-up and login procedures. Oversaw the back-end server upgrade from Novell to Redhat Linux.

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 – 2007Dec Undergraduate Course Instructor, University of California at Berkeley, Department of Materials Science and Engineering, **MSE 198**, *Corporate Tours*

PUBLICATIONS

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

Research Experience

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 film using Atomic Force Microscopy, Vibrating Sample Magnetometer, Superconducting Quantum Interference 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.

Rates

$250 / hour for consulting and analysis
$300 / hour for deposition and trial testimony