

Joseph Lemberg

Lawrence Berkeley National Laboratory
One Cyclotron Road, MS 62R0203
Berkeley, CA 94720-8253

Tel: (510)-486-5544
Fax: (510)-486-4995
e-mail: JALemberg@lbl.gov

OBJECTIVE:

To obtain a position in the field of failure analysis and forensic engineering that allows me to use my skill and expertise in the mechanical behavior of structural materials to diagnose the causes of structural failures.

EDUCATION:

2005-Present University of California, Berkeley Berkeley, CA
Pursuing a Doctor of Philosophy, Materials Science and Engineering
Masters of Science, Materials Science and Engineering, May 2009
Advisor: Prof. R.O. Ritchie
Project: *In situ bend testing of niobium-reinforced alumina nanocomposites with and without single-walled carbon nanotubes*

2001-2005 Cornell University Ithaca, NY
Bachelor of Science with Honors, Materials Science and Engineering
Minor in Engineering Management
Graduated Magna Cum Laude
Honors Thesis Advisor: Prof. S.P. Baker
Project: *Characterization of Planar flow Spin Cast Al-Si Alloys*

RESEARCH EXPERIENCE:

Fracture Toughness of Mo-Si-B Alloys at Ambient and Elevated Temperatures in Air and Inert Atmospheres

2005-Present Lawrence Berkeley National Laboratory Berkeley, CA

- Ph.D. Dissertation topic
- Designed and executed tests to probe the mechanical behavior of two Mo-Si-B alloys systems at ambient and elevated temperatures
 - Influence of molybdenum content and microstructural morphology on toughness examined
 - Crack growth resistance curves were developed and compared to similar alloy systems
 - DC potential drop technique utilized to monitor crack growth at elevated temperatures
 - Fractography used to determine crack-microstructure interactions

***In-situ* bend testing of Nb-reinforced Al₂O₃ nanocomposites with and without single-walled carbon nanotubes**

2007-2008 Lawrence Berkeley National Laboratory Berkeley, CA

- Master's topic
- Executed in-situ mechanical tests of alumina nanocomposites while observing crack propagation inside a scanning electron microscope
 - Influence of single-wall carbon nanotubes on the fracture toughness of these nano-grained alumina structures

Fatigue testing of cross-linked polyethylene insulation for power distribution cable

2009-Current Lawrence Berkeley National Laboratory Berkeley, CA

- Designed and constructed an environmental chamber for performing fatigue tests of polymers in aqueous environments
 - Fatigue behavior of various insulation materials used in underground power distribution cables
 - Impact of common environments on the fatigue behavior of these materials
 - Effect of environment on so-called “water-trees” in these materials

Strength testing of functionally-graded Al₂O₃-Si₃N₄ and Al₂O₃-Ni materials

2009 Lawrence Berkeley National Laboratory Berkeley, CA

- Studied the effect of temperature and loading rate on the fracture strength of functionally graded ceramic materials

Characterization of Planar Flow Spin Cast Aluminum-Silicon Alloys

2004-2005 Cornell University Ithaca, NY

- Honors Thesis work
- Characterized aluminum and silicon content through foil thickness and along foil length using EDS and WDS
 - Influence of casting speed on foil morphology

Design of a Modified Axisymmetric Shear Probe for Soil Interface Strength Testing

Summer 2003 Georgia Institute of Technology Atlanta, GA

- Designed and tested a modification to an axisymmetric shear probe to test soil/geomembrane interface strength under the supervision of Dr. J. David Frost of the department of Civil Engineering.
 - Probe modification allowed for direct attachment of geomembrane materials the behavior of which was compared to standard geometries.

LEADERSHIP POSITIONS:

East Bay Chairman, Cornell Alumni Association of Northern California	2006-2009
President, Cornell Materials Society	2004-2005
Vice President of Events, Cornell Class of 2005 Council	2004-2005
Co-Chair, Dean’s Advisor Council, College of Engineering, Cornell	2004-2005
Member at Large, Cornell Class of 2005 Council	2001-2004

HONORS AND AWARDS:

National Defense Science and Engineering Graduate Fellow	2006-2009
ASM Twin Tier Chapter Student of the Year Award Recipient	2004
Nanotechnology Fellow, Materials Science and Engineering, Cornell University	2004
Tau Beta Pi Initiate, New York Delta Chapter	2003
Dean’s List, Cornell University, College of Engineering (8 times)	2001-2005

STRUCTURE VS. PROPERTIES ANALYSIS EXPERTISE:

Crack-Growth Resistance Curves: Utilized an array of techniques to accurately measure R-curves *in situ* and *ex situ*.

Driving Force	Linear Elastic Fracture Mechanics
Crack Length	Visual Light Microscopy
	Scanning Electron Microscopy
	Compliance Measurements
	DC Potential Drop Technique

***In situ* Microscopy of Crack Growth:** Real-time study of the evolution of the crack profile to characterize the salient intrinsic and extrinsic toughening mechanisms and their origins.

Microscopy	Visual Light Microscopy
	Scanning Electron Microscopy
	Quantitative backscattered electron imaging

Mechanical Testing: Characterized pertinent mechanical properties using a variety of techniques.

Depth sensing nano-/micro indentation	Modulus	Hardness
Tension, Compression, Bending	Stress-strain Behavior	Modulus
	Yield Strength	Ultimate Strength
	Strain to Failure	Work to Fracture
	Fracture Toughness	R-Curve
	Creep	Fatigue

Microstructural Characterization: Utilized microscopy techniques to characterize the microstructures of diverse materials.

Characterization	Energy Dispersive Spectroscopy
	Wavelength Dispersive Spectroscopy
	Electron Backscattered Diffraction

EQUIPMENT AND INSTRUMENT EXPERIENCE:

Machining	Vertical/horizontal band saws
	Drill Press
Sample Preparation	High- and Low speed Saws
	Razor Micronotching
	Polishing wheels and vibrating polishers
Mechanical Testing	Microhardness indenter
	Servo-hydraulic Test Frames
	(MTS & Instron, analog & digital controllers)
	Depth-sensing indentation (nano & micro)
	Enduratec Test Frame
Imaging	Visual Light Microscope
	Scanning Electron Microscope
High Temperature	MTS Air Furnance
	Testorr Vacuum/Inert Atmosphere furnace
	DC Potential Drop Apparatus
<i>In situ</i> Testing	Digital test Stage
	Aqueous Environment Chamber

COMPUTER PROGRAMS:

Microsoft Office	Word, Excel, Powerpoint, Outlook
Adobe	Illustrator, Photoshop, Acrobat
Mathematica	
ImageJ	
Endnote	
Labview	
Matlab	

References available upon request.