

# RESUME

**Loren Arthur Jacobson**

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**Personal Data:** Born, 20 August 1938, St. Peter, Minnesota  
U.S. Citizen, Married, Veteran (Lieutenant Colonel, USAF, Retired)

## **Education:**

AB in Engineering Science, Dartmouth College, 1960  
MS in Ceramic Engineering, University of California, Berkeley, 1962  
PhD in Metallurgy, University of California, Berkeley, 1968

## **Teaching Experience:**

**October, 2006** Appointed Adjunct Professor, New Mexico Tech

**September, 2005** Appointed Adjunct Professor, Colorado School of Mines

**Fall Semester, 2006** Part of team teaching Introduction to Materials, a Graduate Level course at New Mexico Tech, Socorro, NM.

**Spring Semester, 2000** Taught Junior level Physical Metallurgy and Graduate level Experiment Design courses at New Mexico Tech, Socorro, NM.

**Spring Semester, 1998** Team taught Mechanical Metallurgy Course at New Mexico Tech, Socorro, NM.

**1991, Summer--**Chemistry Lab Instructor, Santa Fe Community College.

**1986-Present** Mentoring and guiding of younger colleagues.

**1965-1968** Teaching Assistant, Metallurgy Laboratory and X-Ray Laboratory, University of California, Berkeley.

**1962--Present** Preparation and presentation of technical papers at technical society meetings, conferences and workshops, preparation for and briefing senior military and government officials.

## **Employment History:**

**June 2003-October 2006** Consultant, Professional Project Services (Pro2Serve) providing support to Los Alamos National Laboratory. Specialty–Beryllium metallurgy and fracture testing activities. These efforts are on hold as of December, 2003 due to budget limitations. Continued as a co-investigator on a Civilian Research and Development Foundation project for preparation of high purity beryllium with Kharkov Institute of Physics and Technology in Ukraine. Visited Kharkov in September 2003.

**October 1986-April 2003** Technical Staff Member, Materials Technology/Metallurgy Group, Los Alamos National Laboratory, Los Alamos, NM.

### Recent Activities:

- Team Leader, Powder Metallurgy Team, since December, 2001.
- Co-principal investigator for a U. S. Government funded project with Brush Wellman Corp. and the Ulba Metallurgical Plant in Kazakhstan.
- Research collaborator on a Civilian Research and Development Foundation project with Kharkov Institute of Physics and Technology in the Ukraine.
- Research on fracture properties of beryllium and new beryllium processes.

### Earlier Activities:

- Team Leader for Mechanical Testing, 1996-1999.
- Project leader for transfer of beryllium technology from Rocky Flats to Los Alamos.
- Member of Beryllium Panel preparing report to the Department of Energy on beryllium for the International Thermonuclear Experimental Reactor.
- Responsible for research on rapidly solidified beryllium alloys, sponsored by the National Aero-Space Plane Program.
- Served as technical advisor to a National Materials Advisory Board committee examining new technologies for reducing the environmental impact of beryllium processing.
- Served as the U.S. Technical Coordinator for a \$4 Million project on “Conversion of Beryllium Production,” sponsored by the U.S. Government and performed by organizations in Kazakstan, including the National Nuclear Center and Kazakh State University in Almaty, and the Ulba Metallurgical Plant in Ust-Kamenogorsk.
- Coordinated evaluation of lightweight materials options for space-based accelerator systems under sponsorship of the Strategic Defense Initiative Office.

**October 1985--September 1986** Metallurgist, Physical Metallurgy Section, Lawrence Livermore National Laboratory, Livermore, CA.

Conducted research on the potential for new alloys in the titanium-aluminum-beryllium system. Performed technical oversight for several Defense Advanced Research Projects Agency programs on high temperature structural materials development. Served on a high level

government working group assessing foreign structural materials technology. Participated as metallurgy advisor to a laboratory weapon program.

**December 1982--October 1985** Physicist, Special Projects Division, Lawrence Livermore National Laboratory, Livermore, CA.

Established, coordinated and performed a program in support of various U.S. Government Agencies, to characterize foreign material samples and assess foreign capabilities in specific materials science disciplines. Served as co-investigator for basic research on the rapid solidification of aluminum-beryllium alloys, and on the potential for new alloys in the titanium-aluminum-beryllium system. Participated on several National Level committees dealing with issues related to materials assessments and policies.

**August 1980--December 1982** Program Manager, Materials Sciences Division, Defense Advanced Research Projects Agency, Arlington, VA.

Managed a \$10 Million annual research program on Rapid Solidification Technology and Metal Matrix Composites, including formulating overall objectives, evaluating program alternatives, advocating and defending program to highest Government levels, and communicating with Academia, Government Laboratories and Industry to insure a balanced program responding to National and DoD needs. Helped organize several major symposia on Rapid Solidification to disseminate results and discuss future objectives.

**July 1978--August 1980** Staff Development Engineer, Headquarters, Air Force Systems Command, Andrews Air Force Base, MD.

Monitored advanced technology demonstration program in materials and structures, and served as the Air Force principal staff officer for materials and structures issues. Participated on numerous panels including a Command-wide study of the utilization of Manufacturing Technology resources, and an interagency team dealing with improperly processed aluminum alloy plate. Was responsible for assembling, coordinating and advocating the Air Force Technology Base budget for Fiscal Year 1980, and assisted with several subsequent years.

**June 1977--July 1978** Staff Scientist, Headquarters, U.S. Air Force, The Pentagon, Washington, DC.

Monitored, coordinated and advocated the Air Force Basic Research program with elements of Air Staff, Air Force Secretariat, and the Undersecretary of Defense for Research and Engineering. Assisted with the preparation of the Air Force Technology Base budget for Fiscal Year 1979. Prepared briefings and text for General Officer appearances before, and statements to Congress and Science and Technology Policy committees.

**April 1975--June 1977** Materials Scientist, Air Force Foreign Technology Division, Wright-Patterson Air Force Base, OH.

Prepared assessments of foreign materials capabilities based on open literature and other information sources. Related new materials developments to system performance, with emphasis on gas turbine engines and aircraft structures.

**June 1971--April 1975** Materials Scientist, Aerospace Research Laboratories, Wright-Patterson Air Force Base, OH.

Served half-time as Deputy Director, Metallurgy and Ceramics Research Laboratory, responsible for administration of budget, and direct supervision of technicians and secretaries. Also performed fundamental research in metallurgy and ceramics involving deformation mechanisms in ordered alloys, and the fracture toughness testing of high technology ceramics.

**August 1968--June 1971** Materials Engineer, Air Force Materials Laboratory, Wright-Patterson Air Force Base, OH.

Served one year on the Laboratory Technical Activities staff, responsible for preparing frequent reports on laboratory accomplishments. Worked for two years in the High Strength Metals Branch on in-house research efforts on powder metallurgy processing of high-strength aluminum alloys, and understanding microstructure-property relationships in titanium alloys.

**June 1965--August 1968** Graduate Student, University of California, Berkeley, CA.

Ph.D. Dissertation topic: Thermally Activated Breakaway of Dislocations from Solute Atom Atmospheres.

**February 1962--June 1965** Materials Engineer, Air Force Materials Laboratory, Wright-Patterson Air Force Base, OH.

Monitored research contracts on the mechanical behavior of ceramic materials and intermetallic compounds. Performed in-house research on the sintering behavior and phase transformation of zirconium dioxide, and on the statistics associated with brittle fracture.

**September 1960--February 1962** Graduate Student, University of California, Berkeley, CA.

M.S. Thesis topic: Strength of a Two Phase Model Ceramic System.

#### **Society Memberships:**

The Metallurgical Society, AIME  
American Society for Metals  
Sigma Xi  
American Association for the Advancement of Science

## **Honors and Awards:**

Air Force Commendation Medal--1965

Air Force Meritorious Service Medal--1975 Air Force MSM, First Cluster--1980

Air Force Systems Command Science & Engineering Award--1975

Defense Meritorious Service Medal--1982

## **PUBLICATIONS:**

"The Potential of Intermetallic Compounds for Turbine Engine Applications," TM-MAM 64-27 (1964).

"Metallographic Observation of the Monoclinic-Tetragonal Phase Transformation in ZrO<sub>2</sub>," co-author: L. L. Fehrenbacher, *Journal of the American Ceramic Society*, 48, p 157-161 (1965).

"The Investigation of Microstructure in Structural Ceramics," co-author: H. M. Burte, AFML TR 65-10 (1965).

"Intermetallic Compounds," in Air Force Materials Symposium, AFML TDR 65-29 (1965).

"The Role of Rare Earth Oxides in the Stabilization of Cubic Zirconia," co-authors: L. L. Fehrenbacher and C. T. Lynch, in Proceedings of the Fourth Rare Earth Conference, Gordon and Breach Science Publishers, Inc., New York (1965).

"Sintering Behavior of Unstabilized Zirconium Oxide," co-authors: L. L. Fehrenbacher and C. T. Lynch, AFML TDR 65-65 (1965).

"The Weibull Statistical Distribution as Applied to Brittle Fracture," AFML TDR 65-176 (1965).

"Sintering Behavior of Stabilized ZrO<sub>2</sub> Compositions," co-authors: L. L. Fehrenbacher and C. T. Lynch, AFML TDR 65-394 (1965).

"Surface and Microstructural Influence on Flexure Strength of Dense Polycrystalline MgO," co author: L. L. Fehrenbacher, AFML TR 66-91 (1966).

"Solute Atom Locking of Dislocations," Lawrence Radiation Laboratory Report UCRL-18310 (1968).

"Microstructures of Powder and Conventionally Processed 7075 Aluminum Alloy," co-authors: C. M. Pierce and M. M. Cook, AFML TR 71-240 (1971).

"Digital Computer Analysis of Alpha-Beta Titanium Alloy Microstructure," co-authors: P. J. Caulfield and M. E. Rosenblum, in Titanium Science and Technology, Jaffee and Burte, eds. Plenum Press, New York--London, p. 1695 (1973).

"The Strength of Silicon Nitride After Exposure to Different Environments," co-author: J. J. Petrovic, in Ceramics for High Performance Applications, J. J. Burke, ed. Brook Hill Publishing Co., Chestnut Hill, Mass. p. 397 (1974).

"The Effect of Controlled Surface Flaws on the Strength of Silicon Nitride," co-authors: J. J. Petrovic, P. K. Talty and A. K. Vasudevan, Journal of the American Ceramic Society, V. 58 #3-4, p. 113 (1975).

"Preliminary Study of the use of Ceramic Nozzle Arrays in Gas Dynamic Lasers," co-author: J. E. Drewry, ARL TR 75-0100 (1975).

"Determination of Texture Pole Figures Using Picker FACS-1 Apparatus," co-author: R. Schafrik, ARL TR 75-0190 (1975).

"Deformation Modes in NbAl<sub>3</sub>," co-author: D. Shechtman, Metallurgical Transactions, V 6A, p. 1325 (1975).

"Controlled Surface Flaws in Hot Pressed SiC," co-author: J. J. Petrovic, Journal of the American Ceramic Society, V. 59, p. 34 (1976).

"Effects of Residual Stress on Fracture from Controlled Surface Flaws," co-authors: J. J. Petrovic, R. A. Dirks and M. Mendiratta, Journal of the American Ceramic Society, V. 59, p. 177 (1976).

"Rapid Solidification--Past Promise and Current Reality," co-authors: A. M. Adair, E. C. van Reuth and J. Dickson, in Rapid Solidification, Principles and Technologies III, R. Mehrabian, ed., NBS Special Publication, p. 609 (1983).

"Rapidly Solidified Microstructures in Eutectic Alloys," co-authors: Lee E. Tanner and Ron Gronsky, in Proceedings of the 43d Annual Meeting of the Electron Microscopy Society of America, G. W. Bailey, Ed. San Francisco Press, Inc., p. 50 (1985).

"Rapidly Solidified and Thermally Treated Microstructures of Beryllium-1wt% Yttrium Alloy," co-authors: P. L. Martin and T. E. Mitchell, in Proceedings of the 46th Annual Meeting of the Electron Microscopy Society of America, G. W. Bailey, Ed. San Francisco Press, Inc., p. 782 (1988).

Numerous Progress Reports on Rapidly Solidified Beryllium Alloys for the National Aerospace Plane Program.

"Microstructure of Titanium Beryllide TiBe<sub>12</sub>," co-authors: D. Banerjee, J. Zindel and T. Mitchell, in Proceedings of Materials Research Society Meeting 1990.

"Hyperconductivity in chilled beryllium metal," Co-authors: Mueller, FM; Johnson, KA; Medina, WJ; Lewis, HD; Phillips, DS; Hundley, MF; Thompson, JD; Fisk, Z; Maggiore, CJ; et. al.; Applied Physics Letters ; 1990; v.57, no.3, p.240-242

"Current progress in NIF target concepts," Co-authors: Gobby, PL; Foreman, LR; Thoma, DJ; Hollis, RV; Barrera, J; Mitchell, MA; Salazar, MA and Salzer, LJ: Fusion Technology; Dec. 1996; v.30, no.3, pt.2A, p.534-538

"Plasma Spraying of Beryllium and Beryllium-Aluminum-Silver Alloys," co-authors: R.G. Castro, P.W. Stanek and K.E. Elliott, Proceedings of Structural Materials Symposium, TMS Materials Week, October 1993, p. 487-499.

"The Effect of Processing Parameters on Plasma Sprayed Beryllium for Fusion Applications," co-authors: R.G. Castro, P.W. Stanek, D.F. Cowgill and L.L. Snead, Proceedings of the Workshop on Beryllium for Fusion Applications, M. Dalle-Donne, Editor, Karlsruhe, Germany, (1993) p.252-276.

"Rapid Solidification Processing," co-author: J. McKittrick, Materials Science and Engineering, Vol. R11, No. 8, March 1994, p. 355-408.

"Mechanical Behavior of Beryllium-Aluminum Composites," Co-authors: D.H. Carter and P.W. Stanek, Proceedings of the Tenth International Conference on Composite Materials, Vancouver, BC, 1995, p.

"Elastic Moduli, Density and Structural Relaxation in Bulk Amorphous Zr-Ti-Cu-Ni-Be Alloy," Co-authors: Yi He, R.B. Schwarz and D. Mandrus, Journal of Non-Crystalline Solids, Oct. 1996; v.207, pt.2, p.602-606

"Age Hardening in Beryllium-Aluminum-Silver Alloys," Co-authors: D.H. Carter, A. McGeorge and P.W. Stanek, Acta Materialia; NOV 1996; v.44, no.11, p.4311-4315

"Microstructural study of hydrogen-implanted beryllium", Co-authors: Vagin, SP; Chakrov, PV; Utkelbayev, BD; Field, RD; Kung, H, Journal of Nuclear Materials; Oct. 1998; v.263, pt.A, p.719-723

"Beryllium, the final frontier: A letter to my grandson," MRS Bulletin; Feb. 1999; v.24, no.2, p.4-6

"Beryllides", Co Authors: Robert Hanrahan and James Smith, in "Intermetallic Compounds: Vol. 3, Principles and Practice," Edited by J. H. Westbrook and R. L. Fleischer, John Wiley and Sons, Chichester (2002) p. 37-51.

"Microstructural development in the dual phase intermetallic alloy Ni<sub>50</sub>Al<sub>25</sub>Be<sub>25</sub>", Co-authors: Hanrahan, RJ; Field, RD; Thoma, DJ; and Banerjee, D, Intermetallics; Feb. 2003; v.11, no.2, p.95-100

**PATENTS:**

"Alloy for Brazing Silicon to Metal," with Donald Kitchen, #4,214,904, 29 July 1980.

"Grips for Tension-Compression Fatigue Testing", with David Sandoval and Richard Less, #6,330,830, 18 December 2001

"Characterization of Residual Stress in Metals Using Liquid Metal Alloys," with David Michel and Jeffrey Wyatt #6,487,915 , 3 December 2002