LORENZO VALDEVIT

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PROFESSIONAL APPOINTMENTS

Associate Professor	2013-present	**University of California at Irvine** Department of Mechanical and Aerospace Engineering Dept. of Chemical Eng. and Materials Science
Assistant Professor	2007-2013	**University of California at Irvine** Department of Mechanical and Aerospace Engineering Dept. of Chemical Eng. and Materials Science (as of July 2008)
Postdoctoral Scholar	2005-2007	**University of California at Santa Barbara** Materials Department
Visiting Scientist	2005-2007	**Cornell University** Applied and Engineering Physics Department
Summer Intern	2005	**IBM Corporation** T. J. Watson Research Center

EDUCATION

Ph.D., Mechanical and Aerospace Engineering	2005	**Princeton University** *Advisor:* A. G. Evans. *Thesis:* 'Thermo-mechanical optimization of all-metallic prismatic sandwich panels'
Visiting Research Assistant	2002-2005	**Harvard University** *Faculty mentor:* John W. Hutchinson
Master of Arts	2002	**Princeton University**
Laurea (US Equivalent: M.S.) Materials Engineering *110/110 summa cum laude*	2000	**University of Trieste, Italy** *Advisor:* Valter Sergo

HONORS AND AWARDS

Breakthrough Award	2012	**Popular Mechanics**
Outstanding Engineering Educator Award	2012	**Orange County Engineering Council**
Eminent Engineer Member	2009	**Tau Beta Pi** Engineering Honors Society
Invited participant	2009	**NAE – von Humbolt Foundation** 12th German-American Frontiers of Eng. Symposium
Member	2008	**Pi Tau Sigma** Mechanical Eng. Honors Society
IBM Faculty Award	2007	**IBM Corporation**
Teaching Fellow Award	2003	**Harvard University** Division of Engineering and Applied Sciences
Certificate of Distinction in Teaching	2003	**Harvard University**

JOURNAL PUBLICATIONS

J27. L. Salari-Sharif, T. A. Schaedler, L. Valdevit, 'Energy Dissipation Mechanisms in Hollow Metallic Microlattices', Journal of Materials Research, 2014 (In press)
J26. A. Asadpoure, J. Guest, L. Valdevit, 'Incorporating Fabrication Cost into Topology Optimization of Discrete Structures and Lattices', Structural and Multidisciplinary Optimization, 2014 (In press)
J25. L. Salari-Sharif, L. Valdevit, 'Accurate Stiffness Measurement of Ultralight Hollow Metallic Microlattices by Laser Vibrometry', Experimental Mechanics, 2014 (In press)

J24. J. Rys, L. Valdevit, T.A. Schaedler, A.J. Jacobsen, W.B. Carter, J.R. Greer, 'Fabrication and Deformation of Metallic Glass Micro-Lattices', Advanced Engineering Materials (2014) DOI: 10.1002/adem.201300454
J23. K. Azgin, L.Valdevit, 'The effects of tine coupling and geometrical imperfections on the response of DETF resonators', Journal of Micromechanics and Microengineering 23 (2013) 125011 (12p)
J22. K. J. Maloney, C. S. Roper, A. J. Jacobsen, L. Valdevit, W. B. Carter, T. A. Schaedler, 'Microlattices as Architected Thin Films: Analysis of Mechanical Properties and High Strain Elastic Recovery', APL Materials 1 (2013) 022106
J21. L. Valdevit, S. W. Godfrey, T. A. Schaedler, A. J. Jacobsen, W. B. Carter, 'Compressive Strength of Hollow Microlattices: Experimental Characterization, Modeling and Optimal Design', Journal of Materials Research, Special Issue on Porous Metals 28 (2013) 2461-73.
J20. J. Lian, S-W. Lee, L. Valdevit, M. I. Baskes, J. R. Greer, 'Emergence of film thickness and grain size dependent elastic properties in nanocrystalline thin films', Scripta Materialia 68 (2013) 261–64
J19. K. Azgin, T. Akin, L. Valdevit, 'Ultra-high dynamic range resonant MEMS load cells for micromechanical test frames', Journal of Microelectromechanical Systems 21 (2012) 1519-1529
J18. A. Torrents, T. A. Schaedler, A. J. Jacobsen, W. B. Carter, L. Valdevit, 'Characterization of nickel-based microlattice materials with structural hierarchy from the nanometer to the millimeter scale', Acta Materialia 60 (2012) 3511-3523
J17. T. A. Schaedler, A. J. Jacobsen, A. Torrents, A. E. Sorensen, J. Lian, J. R. Greer, L. Valdevit, W. B. Carter, 'Ultralight Metallic Microlattices', Science, 334 (6058) pp. 962-96 (2011)
J16. C-H. Chen, A. Torrents, L. Kulinsky, R. D. Nelson, M. Madou, L. Valdevit, J.C. LaRue, 'Mechanical Characterizations of Cast Poly(3,4-ethylenedioxythiophene):Poly(styrenesulfonate)/Polyvinyl Alcohol thin films', Synthetic Metals, 161 (2011) 2259–2267
J15. N. Vermaak, L. Valdevit, A. G. Evans, F. W. Zok and R. M. McMeeking, 'Implications of Shakedown for Design of Actively-Cooled Thermostructural Panels', Journal of the Mechanics of Materials and Structures, 6 [9-10] (2011) 1313-1327
J14. J. Lian, L. Valdevit, T. A. Schaedler, A. J. Jacobsen, W. B. Carter and J. R. Greer, 'Catastrophic vs. gradual collapse of thin-walled nanocrystalline Ni cylinders as building blocks of micro-lattice structures', Nano Letters, 11 [10] (2011), 4118-4125
J13. M. A. Kotlarchyk, S. G. Shreim, M. B. Alvarez-Elizondo, L. C. Estrada, R. Singh, L. Valdevit, E. Kniazeva, E. Gratton, A. J. Putnam and E. L. Botvinick, 'Concentration independent modulation of local micromechanics in a fibrin clot', PLoS ONE, 6 (5) pp. e20201 (2011)
J12. L. Valdevit, A. J. Jacobsen, J. R. Greer and W. B. Carter, 'Protocol for the Optimal Design of Multifunctional Structures: From Hypersonics to Micro-Architected Materials', Journal of the American Ceramic Society, Special Issue in Honor of Anthony G. Evans, 94 [S1] (2011), S15-S34
J11. A. Torrents, K. Azgin, S. W. Godfrey, E. S. Topalli, T. Akin, L. Valdevit, 'MEMS resonant load cells for micro-mechanical test frames: Feasibility study and optimal design', Journal of Micromechanics and Microengineering, 20 (2010) 125004 (17pp)
J10. M. Gamero-Castano, A. Torrents, L. Valdevit, J-G. Zheng, 'Pressure Induced Amorphization in Silicon Caused by the Impact of Electrosprayed Nanodroplets', Physical Review Letters, 105, 145701 (2010)
J9. N. Vermaak, L. Valdevit, A. G. Evans, 'Influence of Configuration on Materials Selection for Actively-Cooled Combustors', AIAA Journal of Propulsion and Power, 26 (2010)
J8. C. Steeves, M.Y. He, S.D. Kasen, L. Valdevit, H.N.G. Wadley and A.G. Evans, 'Feasibility of metallic structural heat pipes as sharp leading edges for hypersonic vehicles', J. of Appl. Mechanics, 76 (2009)
J7. N. Vermaak, L. Valdevit, A.G. Evans, 'Materials Property Profiles for Actively Cooled Panels: An Illustration for Scramjet Applications', Metallurgical and Materials Transactions A, 40A (2009), 877-890
J6. L. Valdevit, N. Vermaak, F. W. Zok, A. G. Evans, 'A materials selection protocol for lightweight actively cooled panels', Journal of Applied Mechanics, 75 (2008)
J5. L. Valdevit, V. Khanna, A. Sharma, S. Sri-Jayantha, D. Questad, K. Sikka, 'Organic substrates for flip chip design: a thermo-mechanical model that accounts for heterogeneity and anisotropy', Microelectronics Reliability, 48 (2008), 245-260
J4. L. Valdevit, A. Pantano, H. A. Stone, A. G. Evans, 'Optimal active cooling performance of metallic sandwich panels with prismatic cores', Int. Journal of Heat and Mass Transfer, 49 (2006), 3819-3830
J3. L. Valdevit, Z. Wei, C. Mercer, F. W. Zok, A. G. Evans, 'Structural performance of near-optimal sandwich panels with corrugated cores', Int. Journal of Solids and Structures, 43 (2006), 4888-4905
J2. T. J. Lu, L. Valdevit, A. G. Evans, 'Active cooling by metallic sandwich structures with periodic cores', Progress in Materials Science, 50 (2004), 789-815
J1. L. Valdevit, J. W. Hutchinson, A. G. Evans, 'Structurally optimized sandwich panels with prismatic cores', International Journal of Solids and Structures, 41 (2004), 5105-5124

PUBLICATIONS IN CONFERENCE PROCEEDINGS

C8. J. Giner de Haro, L. Valdevit, A. Shkel, 'Glass-Blown Pyrex Resonator with Compensating Ti Coating for

Reduction of TCF', International Symposium of inertial Sensors and Systems, Laguna Beach, CA, Feb 25, 2014

C7. A. L. R. Moodie, J. P. Angle, E. C. Tackett, T. J. Rupert, M. L. Mecartney, L. Valdevit, 'Ceramic and hybrid micro-architected materials for high temperature applications', SAMPE 2013, Long Beach, CA, May 6-9, 2013

C6. S.W. Godfrey, L. Valdevit, 'A novel modeling platform for characterization and optimal design of micro-architected materials', 2012 AIAA Structural Dynamics and Materials Conference, Honolulu, HI, Apr 2012. AIAA Paper # 2012-2003

C5. K. Azgin, C. Ro, A. Torrents, T. Akin and L. Valdevit, 'A resonant tuning fork sensor with unprecedented combination of resolution and range', 2011 IEEE MEMS Conference, Cancun, Mexico, Jan 2001

C4. L. Valdevit, N. Vermaak, F. W. Zok and A. G. Evans, 'The design space of Superalloy-based actively cooled combustor walls for Mach 7-12 hypersonic vehicles', ASME IMECE 2007-41348, Seattle, USA, Nov 2007

C3. N. Vermaak, L. Valdevit, F. W. Zok and A. G. Evans, 'Design and implementation of actively cooled panels for scramjets', ASME IMECE 2007-41347, Seattle, USA, Nov. 11-15, 2007

C2. C. Steeves, L. Valdevit, M. He and A. G. Evans, 'Metallic structural heat pipes as sharp leading edges for Mach 7 vehicles', ASME IMECE 2007-42397, Seattle, USA, Nov 11-15, 2007

C1. L. Valdevit, N. Vermaak, K. Hsu, F. W. Zok and A. G. Evans, 'Design of actively cooled panels for scramjets', 14th AIAA/AHI International Space Planes and Hypersonic Systems and Technologies Conference, Canberra, Australia, Nov 6-9, 2006. AIAA Paper 2006-8069

BOOK CHAPTERS

B1. L. Valdevit, J. W. Hutchinson, 'Plasticity Theory at Small Scales', In *Encyclopedia of Nanotechnology*, B. Bhushan, Editor. 2012, Springer.

SELECTED INVITED TALKS

- 'Optimal design of micro-architected materials', MIMENIMA (Micro-, meso- and macroporous nonmetallic Materials: Fundamentals and Applications) Research Training Group Seminar Series, University of Bremen, Germany, Jun 2014
- 'Optimal design of hollow micro-lattices', US National Congress on Theoretical and Applied Mechanics, East Lansing, MI, Jun 2014
- 'Optimization strategies for micro-architected materials', Keynote Address, 1st International Conference on Engineering and Applied Sciences Optimization, Kos, Greece, Jun 2014
- 'Optimal design of micro-architected materials', Mechanical and Aerospace Engineering Seminar Series, University of California, San Diego, La Jolla, CA, Apr 2014
- 'Optimal design of stiff and lossy multiphase cellular materials', AmeriMech Symposium on Dynamic Response of Periodic Materials and Structures, Atlanta, GA, Apr 2014
- 'Additive Manufacturing of Architected Materials', Keynote Address, 2nd International Conference on Design and Processes for Medical Devices, Monterrey, Mexico, March 2014
- 'Using Laser Doppler Vibrometry to characterize stiffness and damping of micro-architected materials', Polytec Technology Seminar for Structural Dynamics, Los Angeles, CA Nov 2013
- 'Lightweight Multifunctional Micro-architected Materials with Superior Damping Characteristics', Mechanical Engineering Colloquium, University of California, Riverside, May 2013
- 'Hierarchical architected materials as a platform for novel multifunctional systems', Hopkins Extreme Materials Institute Seminar Series, Johns Hopkins University, Feb 2013
- 'Hierarchical architected materials as a platform for novel multifunctional systems', Grenoble Institute of Technology, France, Sep 2012
- 'Hierarchical architected materials as a platform for novel multifunctional systems', Karlsruhe Institute of Technology, Germany, Sep 2012
- 'Characterization and optimal design of nickel-based micro-lattice materials with structural hierarchy from the nanometer to the millimeter scale', Physical Chemistry Seminar Series, UCLA, Feb 2012
- 'Characterization and optimal design of nickel-based micro-lattice materials with structural hierarchy from the nanometer to the millimeter scale', Boeing Distinguished Researcher and Scholar Seminar Series (B-DRASS), Huntington Beach, CA, Feb 2012
- 'Exploiting plasticity size effects in macroscopic micro-architected cellular materials: Challenges and Opportunities', International Symposium on Plasticity, San Juan, PR, Jan 2012
- 'Ultralight Metallic Microlattices- the lightest material on Earth', University of Trieste, Italy, Dec 2011
- 'Characterization and optimal design of nickel-based micro-lattice materials with structural hierarchy from the nanometer to the millimeter scale', MAE Seminar Series, Johns Hopkins University, Nov 2011
- 'Multi-scale characterization of nickel micro-lattices under compressive loads', 2011 MS&T Conference, Columbus, OH, Oct 2011
- 'Designing micro-architected materials for future multifunctional systems', The Boeing Company – Phantom

Works, Huntington Beach, CA, Jul 2011
- 'Protocol for the Optimal Design of Multifunctional Structures: From Hypersonics to Micro-Architected Materials', Galcit Colloquium, California Institute of Technology, Oct 2010
- 'Protocol for the Optimal Design of Multifunctional Structures: From Hypersonics to Micro-Architected Materials', Materials Engineering: Building on the Legacy of Tony Evans, A Memorial Conference, UCSB, Sep 7-9, 2010
- 'Optimal Design of Micro-Architected Materials', Army Research Office Workshop on Intelligent and Active Protective Systems for Dynamic Load Mitigation, Aberdeen, MD, May 2010
- 'Multifunctional sandwich structures: from aerospace applications to microelectromechanical systems', The Boeing Company – Phantom Works, Huntington Beach, CA, Jan 2008
- 'Thermal management solutions for hypersonic vehicles', Tsinghua University, Beijing, People's Republic of China, Nov 2007 and Indian Inst. of Science, Bangalore, India, Nov 2007
- 'Multifunctional sandwich structures: from aerospace applications to microelectromechanical systems', Intel Research Pittsburgh, Pittsburgh, PA, Dec 2006

PATENTS

- Valdevit, L., Azgin, K., "Self Calibrating Micro-Fabricated Load Cells", US Patent filed on 03/15/2013
- Valdevit, L., Sri-Jayantha, S., "Elliptic C4 with Optimal Orientation for Enhanced Reliability in Electronic Packages", United States Patent 20080217384. Owner: IBM Corp.
- Sri-Jayantha, S., Valdevit, L., Sharma, A., Khanna, V., Questad, D., Munce, J., "Electronic Components on Trenched Substrates and Method of Forming Same", United States Patent 20080205023. Owner: IBM Corp.

PROFESSIONAL SERVICE ACTIVITIES

Service to UCI
- Chair, MAE Undergraduate Studies Committee, 2014-present.
- Aerospace Engineering Undergraduate Advisor, 2014-present.
- Henry Samueli School of Engineering Executive Committee Member, 2012-present.
- Laboratory for Electron and X-Ray Instrumentation (LEXI) Faculty Oversight Committee Member, 2012-present
- Faculty Advisor, Tau Beta Pi, California Tau Chapter, 2009-present.
- UCI Academic Senate Board on Undergraduate Scholarships, Honors and Financial Aids, Chair, 2013-present.
- UCI Academic Senate Board on Undergraduate Scholarships, Honors and Financial Aids, Member, 2012-2013.
- UCI Academic Senate Divisional Representative to the U-Wide Assembly, Alternate Member, 2010-2012.
- MAE Graduate Studies Committee, 2009-2011.
- MAE Faculty Search Committee, 2008-2011.
- MAE Undergraduate Studies Committee, 2007-2011. Co-led a significant restructuring of the curriculum in mechanics, materials and structures.

Service to the Scientific Community
- Symposium Co-organizer, 2013 MRS Fall Meeting, Dec 1-6, 2013, Boston, MA
- Section Editor for Springer Encyclopedia of Nanotechnology, 2nd Ed. (Ed.: B. Bhushan), May 2014-present
- Section Editor for Springer Encyclopedia of Nanotechnology (Ed.: B. Bhushan), June 2010-Sep 2011
- Co-organizer and co-chair for session 'Optimal Design of Structures', ASME IMECE, Nov. 2009
- Organizer and Chair for session 'Smart Materials and Structures', ASME IMECE, Nov. 2008, Nov. 2009
- Member of the ASME Multifunctional Materials Technical Committee, 2007-2009
- Reviewer for over 15 archival journals, including: Science, PNAS, ACS Nano, International Journal of Solids and Structures, Journal of Applied Mechanics, Journal of Mechanics of Materials and Structures, Mechanics of Materials, Computer Modeling in Engineering and Sciences, ASME Journal of MEMS, Sensors and Actuators A, Acta Materialia, Composites Part A, International Journal of Heat and Mass Transfer, Journal of the American Ceramic Society.

RESEARCH INTERESTS

Prof. Valdevit works in the general area of mechanics of materials, developing analytical, numerical and experimental techniques across multiple length scales. His primary research goal is the optimal design, modeling, fabrication and experimental characterization of hierarchical architected materials with superior combination of properties. His group has recently developed novel micro-mechanical test frames and numerical algorithms to enable this overarching goal.