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PROFESSIONAL APPOINTMENTS

Member	2020-present	US Department of Commerce Emerging Technology Technical Advisory Committee
Director	2015-present	University of California, Irvine Institute for Design and Manufacturing Innovation
Professor	2019-present	University of California at Irvine Department of Materials Science and Engineering Department of Mechanical and Aerospace Engineering
Associate Professor	2018-2019	University of California at Irvine Department of Materials Science and Engineering Department of Mechanical and Aerospace Engineering
Associate Professor	2013-2018	University of California at Irvine Department of Mechanical and Aerospace Engineering Department 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 <i>Advisor: A. G. Evans. Thesis: 'Thermo-mechanical optimization of all-metallic prismatic sandwich panels'</i>
Visiting Research Assistant	2002-2005	Harvard University <i>Faculty mentor: John W. Hutchinson</i>
Master of Arts	2002	Princeton University
Laurea (US Equivalent: M.S.) Materials Engineering <i>110/110 summa cum laude</i>	2000	University of Trieste, Italy <i>Advisor: Valter Sergio</i>

HONORS AND AWARDS

Outstanding Faculty Service Award	2019	School of Engineering, University of California, Irvine
Keynote Lecturer	2019	Society of Experimental Mechanics Annual Conference, Mechanics of Additive and Advanced Manufacturing Track, Reno, NV
Keynote Lecturer	2014	1st International Conference on Engineering and Applied Sciences Optimization, Kos, Greece
Keynote Lecturer	2014	2nd PROMED Conference, Monterrey, Mexico

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 12 th 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

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 metamaterials and structures with unprecedented combinations of properties. Some key research accomplishments have been the development and optimization of multifunctional sandwich panels for thermo-structural applications (including hypersonics), the mechanical characterization, numerical modeling and optimal design of ultralight hollow micro-lattices and 2D and 3D shape-reconfigurable materials, the development of novel topology optimization algorithms for the optimal design of architected materials with complex unit cell designs, and the advance of novel additive manufacturing processes for micro and nano-architected materials. Three current areas of interest are the investigation and exploitation of beneficial size effects in nano-architected materials, the non-linear design of mechanical metamaterials and the understanding of the processing / microstructure / properties relations in additive manufacturing (in particular two-photon polymerization Direct Laser Writing and Direct Metal Laser Sintering).

INSTITUTE FOR DESIGN AND MANUFACTURING INNOVATION (IDMI)

<http://manufacturing.uci.edu>

Since 2015, Prof. Valdevit has been serving as the Inaugural Director of the Institute for Design and Manufacturing Innovation (IDMI) in the School of Engineering. IDMI has the overarching goal of establishing UCI as a national leader in advanced manufacturing, through research, education and outreach. Specifically, IDMI plans to (i) provide a forum for coordinated and interdisciplinary research activities in advanced manufacturing, (ii) educate the advanced manufacturing workforce of tomorrow, by infusing manufacturing education in our existing programs, creating new manufacturing programs and providing our students access to state-of-the-art infrastructure, (iii) develop a strong partnership with industry and (iv) serve the community at large through a number of outreach initiatives. The key technical thrusts of IDMI are **Additive Manufacturing** (in particular metal additive manufacturing, scalable micro/nano-manufacturing and design of architected materials), **Advanced Metal Processing** and **Digital/Smart Manufacturing**.

EMERGING TECHNOLOGY TECHNICAL ADVISORY COMMITTEE, US DEPARTMENT OF COMMERCE

Since 2020, Prof. Valdevit has been serving as a member of the Emerging Technology Technical Advisory Committee (ETTAC) at the U.S. Department of Commerce. ETTAC advises the U.S Department of Commerce on emerging technologies with potential dual-use applications as early as possible in their developmental stages both within the United States and abroad. The work of the committee is forward leaning—focusing both on the current state of such technologies and projecting their likely effects five to ten years in the future on national security, the U.S. defense industrial base, and the overall health and competitiveness of the U.S. economy.

JOURNAL PUBLICATIONS

In total 55 journal papers, 12 conf. papers, 3 book chapters and 2 co-edited books
 ISI h-index = 20; Google Scholar h-index = 24; Google Scholar i10-index: 39

- [J55]. J. Lienhard, C. Crook, M. Zahiri Azar, M. Hassani, D. R. Mumm, D. Veysset, D. Apelian, K. Nelson, V. Champagne, A. Nardi, C. A. Schuh, L. Valdevit, 'Surface Oxide and Hydroxide Effects on Aluminum Microparticle Impact Bonding', *Acta Materialia* (2020) Accepted.
- [J54]. J. Bauer, A. Guell Izard, Y. Zhang, T. Baldacchini, L. Valdevit, 'Thermal post-curing as an efficient strategy to eliminate process parameter sensitivity in the mechanical properties of two-photon polymerized materials', *Opt. Express*, 28 (2020) 20362–20371
- [J53]. A. Guell Izard, E. P. Garcia, M. Dixon, E. O. Potma, T. Baldacchini, L. Valdevit, 'Enhanced substrate adhesion in two-photon polymerization direct laser writing', *AIP Advances* 10 (2020) 045217
- [J52]. C. Crook, J. Bauer, A. Guell Izard, C. S. de Oliveira, J.M. de Souza e Silva, J.B. Berger, L. Valdevit, 'Plate-nanolattices at the theoretical limit of stiffness and strength', *Nature Communications* (2020) 1–11. <http://doi.org/10.1038/s41467-020-15434-2>
- [J51]. M-T. Hsieh, V.S. Deshpande, L. Valdevit, 'A versatile numerical approach for calculating the fracture toughness and R-curves of cellular materials', *Journal of the Mechanics and Physics of Solids* 138 (2020) 103925–18
- [J50]. A. Guell Izard, J. Bauer, C. Crook, V. Turlo, L. Valdevit, 'Ultrahigh energy absorption multifunctional spinodal nanoarchitectures', *Small* (2019) 1903834
- [J49]. S. Farzinazar, T. A. Schaedler, L. Valdevit, J. Lee, 'Thermal transport in hollow metallic microlattices', *APL Materials* 7 (2019) 101108
- [J48]. D. M. Kochmann, J. B. Hopkins, L. Valdevit, 'Multiscale modeling and optimization of the mechanics of hierarchical metamaterials', *MRS Bulletin* 44 (2019) 773-781
- [J47]. J. Bauer, C. Crook, A. Guell Izard, Z. C. Eckel, N. Ruvalcaba, T. A. Schaedler, L. Valdevit, 'Additive Manufacturing of Ductile, Ultrastrong Polymer-Derived Nanoeramics', *Matter* 1 (2019) 1547-1556
- [J46]. A. E. Garcia, C. Santillan Wang, R. N. Sanderson, K. M. McDevitt, Y. Zhang, L. Valdevit, D. R. Mumm, A. Mohraz, R. Ragan, 'Scalable Synthesis of gyroid-inspired freestanding three-dimensional graphene architectures', *Nanoscale Adv.* 1 (2019) 3870-3882
- [J45]. J. Bauer, A. Guell Izard, Y. Zhang, T. Baldacchini, L. Valdevit, 'Programmable Mechanical Properties of Two-Photon Polymerized Materials: From Nanowires to Bulk', *Advanced Materials Technologies* (2019) 1900146
- [J44]. A. Guell Izard, L. Valdevit, 'Magnetoelastic Metamaterials for Energy Dissipation and Wave Filtering', *Advanced Engineering Materials* (2019) 1901019–7
- [J43]. L. Salari-Sharif, B. Haghpanah, A. Guell Izard, M. Tootkaboni, L. Valdevit, 'Negative-Stiffness Inclusions as a Platform for Real-Time Tunable Phononic Metamaterials', *Physical Review Applied* 11 (2019) 024062
- [J42]. M-T. Hsieh, B. Endo, Y. Zheng, J. Bauer, L. Valdevit, 'The mechanical response of architected materials with spinodal topologies'. *Journal of the Mechanics and Physics of Solids* 125 (2019) 401-419
- [J41]. L. Salari-Sharif, S. Ryan, M. Pelacci, J.K. Guest, L. Valdevit, S. Szyniszewski, 'Damping of selectively bonded 3D woven lattice materials'. *Scientific Reports* (2018) 8:14572
- [J40]. L. Valdevit, K. Bertoldi, J. K. Guest, C. Spadaccini, 'Architected Materials: Synthesis, Characterization, Modeling and Optimal Design', *Journal of Materials Research* 33 (2018) 241-246
- [J39]. L. Salari-Sharif, T. A. Schaedler, L. Valdevit, 'Hybrid Hollow Microlattices With Unique Combination of Stiffness and Damping'. *Journal of Engineering Materials and Technology* 140 (2018) 031003-14

- [J38]. L. Salari-Sharif, S.W. Godfrey, M. Tootkaboni, L. Valdevit, 'The effect of manufacturing defects on compressive strength of ultralight hollow microlattices: A data-driven study'. *Additive Manufacturing* 19 (2017) 51–61
- [J37]. B. Haghpanah, A. Shirazi, L. Salari-Sharif, A. Guell, L. Valdevit, 'Elastic Architected Materials with Extreme Damping Capacity', *Extreme Mechanics Letters* 17 (2017) 56-61
- [J36]. A. Guell, G. McKnight, L. Valdevit, 'Optimal design of a cellular material encompassing negative stiffness elements for unique combinations of stiffness and elastic hysteresis', *Materials and Design* 135 (2017) 37-50.
- [J35]. J. Bauer, L. R. Meza, T. A. Schaedler, R. Schwaiger, X. Zheng, L. Valdevit, 'Nanolattices: An Emerging Class of Mechanical Metamaterials', *Advanced Materials* (2017) 1701850 (26p)
- [J34]. A. Asadpoure, M. Tootkaboni, L. Valdevit, 'Topology optimization of multiphase architected materials for energy dissipation', *Computer methods in applied mechanics and engineering* 325 (2017) 314-329
- [J33]. SH Alavi, MS Baliarda, N. Bonessio, L. Valdevit, A. Kheradvar, 'A Tri-Leaflet Nitinol Mesh Scaffold for Engineering Heart Valves', *Annals of Biomedical Engineering* (2016) 45(2), 413–426
- [J32]. B. Haghpanah, L. Salari-Sharif, P. Pourrajab, J. Hopkins, L. Valdevit, 'Multistable Shape-Reconfigurable Architected Materials', *Advanced Materials* 28 (2016) 7915–7920 (This article was featured in a Nature Research Highlight, *Nature* 535 (07/2016) 32)
- [J31]. A. Kurup, T. Tran, M. Keating, P. Gascard, L. Valdevit, T. Tlsty, E. Botvinick, 'Novel insights from 3D models: the pivotal role of physical symmetry in epithelial organization', *Scientific Reports* 5 (2015) 15153
- [J30]. J. Bauer, A. Schroer, R. Schwaiger, I. Tesari, C. Lange, L. Valdevit, O. Kraft, 'Push-to-pull tensile testing of ultra-strong nanoscale ceramic-polymer composites made by additive manufacturing', *Extreme Mechanics Letters* 3 (2015) 105-112
- [J29]. C-C. Kuo, Y. Li, D. Nguyen, S. Buchsbaum, L. Innes, A. P. Esser-Kahn, L. Valdevit, L. Sun, Z. Siwy, M. Dennin, 'Macroscopic Strain Controlled Ion Current in an Elastomeric Microchannel', *Journal of Applied Physics* 117 (2015) 174904
- [J28]. A. Asadpoure, L. Valdevit, 'Topology optimization of lightweight periodic lattices under simultaneous compressive and shear stiffness constraints', *International Journal of Solids and Structures*, 60-61 (2015) 1-16
- [J27]. L. Salari-Sharif, T. A. Schaedler, L. Valdevit, 'Energy Dissipation Mechanisms in Hollow Metallic Microlattices', *Journal of Materials Research*, 29 (2014) 1755-1770
- [J26]. A. Asadpoure, J. K. Guest, L. Valdevit, 'Incorporating Fabrication Cost into Topology Optimization of Discrete Structures and Lattices', *Structural and Multidisciplinary Optimization*, 51 (2014) 385-396
- [J25]. L. Salari-Sharif, L. Valdevit, 'Accurate Stiffness Measurement of Ultralight Hollow Metallic Microlattices by Laser Vibrometry', *Experimental Mechanics*, 54 (2014) 1491-1495
- [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* 16 (2014) 889-896
- [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*, 28 (Special Issue on Porous Metals), (2013) 2461-2473
- [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) 261-264
- [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
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- [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 Electrospayed 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), 295-302
- [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', *Journal of Applied Mechanics*, 76 (2009) 031014
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- [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) 061022
- [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', *International 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', *International 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

SELECTED SERVICE ACTIVITIES

- Service to Prof. Soc.** Contributor for 'Metamaterials Manufacturing Report' by MForesight, 2018
Chair of Symposium on Architected Materials, 2015 & 2018 MRS Fall Meeting, Boston
Lead Guest Editor for *Journal of Materials Research* Focus Issue on Architected Materials, Mar 2018
Technical Program Committee for Matematerials 2019, Rome, Italy, Sep 2019
International Advisory Committee for MetFoam 2019, Dearborn, MI, Aug 2019
Advisory Board for AM3D, the Los Angeles Additive Manufacturing Forum
Proposal reviewer for NSF, ONR, AFOSR, LLNL LDRD
Journal reviewers for over 30 journals, including *Science*, *Nature*, *PNAS*
- Service to UCI** Chair, 6 Faculty Search Committees (2018-2021)
Member, School of Engineering Executive Committee (2018-present)
Member, School of Engineering Strategic Planning Committee (2016 – 2017)
Director, Institute for Design and Manufacturing Innovation (2015 – present)
Member, Irvine Materials Research Institute Faculty Oversight Committee (2017–present)
Member, UCI Task Force on Foreign Influence (2019 – present)