



Professor Frank W. Zok

See:

<https://materials.ucsb.edu/people/faculty/frank-w-zok>

<https://labs.materials.ucsb.edu/zok/frank/>

https://scholar.google.com/citations?user=_G9xLCUAAAAJ&hl=en

Zok Research Group, Department of Materials
University of California Santa Barbara, California, USA

About the Zok Research Group:

The Zok Research Group addresses issues in design, synthesis and properties of advanced thermostructural materials and systems. Current activities focus on high-temperature ceramic composites for use in future propulsion systems in aircraft engines and in hypersonic flight vehicles, protection systems for mitigating blast and ballistic threats, and lightweight lattice structures with high specific strength and high straining capability. The research combines experiments with theory and numerical simulation.

Biography (2014)

Frank Zok is Professor of Materials, Director of the Pratt & Whitney Center of Excellence in Composites at the University of California, Santa Barbara, and Task Order Leader of the Cellular Structural Materials thrust in the UCSB Institute of Collaborative Biotechnologies. His research over the past twenty years has addressed issues in mechanical properties of multiphase materials and structures. His current activities focus on hierarchical lightweight cellular materials and high-temperature ceramic composites. Dr. Zok recently served as a member of a National Academies study on Application of Lightweight Technology for Military Vehicles, Vessels, and Aircraft. He has been Associate Editor of the Journal of the American Ceramic Society since 1993. He has served on the editorial board for Current Opinion in Solid State and Materials Science (1998-2008); the Scientific Advisory Board for the AFRL Materials and Manufacturing Directorate (2005); the National Academies Technical Assessment Board for the ARL Panels on Air and Ground Vehicle Technology (2000–04) and on Armor and Armaments (2005–08); the National Science Foundation Panel on Nanomechanics (2006); and the Expert Review Committee on Materials Science, Canada Foundation for Innovation (2008). He was also Chair of the AFOSR Workshop on Ceramic Matrix Composite Lifetime Management (2009). He is presently Chair of the Scientific Advisory Board for the Canadian Magnesium Network (2009–). Dr. Zok has contributed to five book chapters and over 140 scientific publications. Dr. Zok also led the UCSB team that won the 2010 DARPA- sponsored \$50,000 challenge on Digital Manufacturing Analysis, Correlation and Estimation (among over 50 teams from 13 countries worldwide).

Selected Publications:

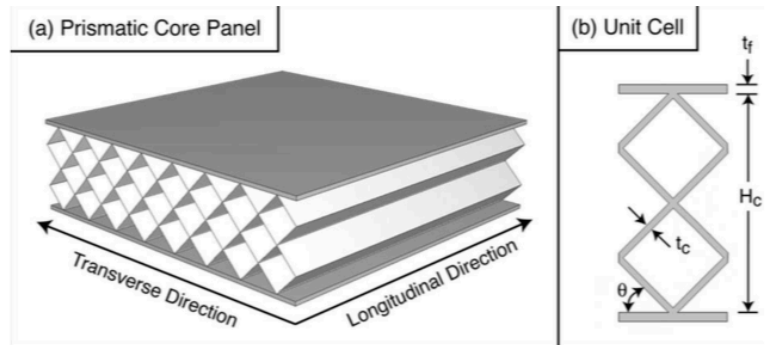


Fig. 1 Schematic of a prismatic core panel and its unit cell

From: Z. Wei, F.W. Zok and A.G. Evans, “Design of sandwich panels with prismatic cores”, ASME Journal of Engineering Materials and Technology, Vol. 128, pp 186-192, April 2006

Yang, J., Cady, C., Hu, M. S., Zok, F., Mehrabian, R. and Evans, A. G. [1990] “ Effects of damage on the flow strength and ductility of a ductile Al-alloy reinforced with SiC particulates,” *Acta Metallurgica Et Materialia* 38(12), 2613–2619.

F. W. Zok, H. J. Rathbun, Z. Wei and A. G. Evans, “Design of metallic textile core sandwich panels”, *International Journal of Solids and Structures*, Vol. 40, No. 21, October 2003, pp. 5707-5722

Rathbun HJ, Wei Z, He MY, Zok FW, Evans AG, Sypeck DJ and Wadley HNG. Measurement and simulation of the performance and a lightweight metallic sandwich structure with a tetrahedral truss core. *Journal of Applied Mechanics*, ASME, 2004; 71: 368–374.

Zok FW, Waltner SA, Wei Z, Rathbun HJ, McMeeking RM, Evans AG. A protocol for characterizing the structural performance of metallic sandwich panels: application to pyramidal truss cores. *International Journal of Solids and Structures* 2004;41:6249-6271.

Zok FW, Rathbun H, He M, Ferri E, Mercer C, McMeeking RM, et al. Structural performance of metallic sandwich panels with square honeycomb cores. *Philosophical Magazine* 2005;85:3207-3234.

H.J. Rathbun, F.W. Zok and A.G. Evans, “Strength optimization of metallic sandwich panels subject to bending”, *International Journal of Solids and Structures*, Vol. 42, No. 26, December 2005, pp. 6643-6661

Z. Wei, F.W. Zok and A.G. Evans, “Design of sandwich panels with prismatic cores”, *ASME Journal of Engineering Materials and Technology*, Vol. 128, pp 186-192, April 2006

Enrico Ferri, Emilio Antinucci, Ming Y. He, John W. Hutchinson, Frank W. Zok and Anthony G. Evans, “Dynamic buckling of impulsively loaded prismatic cores”, *Journal of Mechanics of Materials and Structures*, Vol. 1, No. 8, 1345-1365, 2006

Rathbun HJ, Radford DD, Xue Z, He MY, Yang J, Deshpande V, Fleck NA, Hutchinson JW, Zok FW, Evans AG (2006) Performance of metallic honeycomb-core sandwich beams under shock loading. *Int J Solids Struct* 43(6):1746–1763

L. Valdevit, Z. Wei, C. Mercer, F.W. Zok and A.G. Evans, “Structural performance of near-optimal sandwich panels with corrugated cores”, *International Journal of Solids and Structures*, Vol. 43, No. 16, August 2006, pp. 4888-4905

Rathbun HJ, Zok FW, Waltner SA, Mercer C, Evans AG, Queheillalt DT and Wadley HNG. Structural performance of metallic sandwich beams with hollow truss core. *Acta Materilia*, 2006; 54: 5509–5518

K. Nahshon, M.G. Pontin, A.G. Evans, J.W. Hutchinson, F.W. Zok, “Dynamic shear rupture of steel plates”, *Journal of Mechanics of Materials and Structures*, 2 (2007), pp. 2049-2066

L. Valdevit, N. Vermaak, F. Zok, A.G. Evans, A materials selection protocol for lightweight actively cooled panels, *Journal of Applied Mechanics* 75 (2008) 061022.

C. I. Hammett and F. W. Zok “Compressive response of pyramidal lattices embedded in foams”, *J. Appl. Mech.* 2013;81(1):011006-011006-11. doi:10.1115/1.4024408. January 2014

Steven Wehmeyer, Frank W. Zok, Christopher Eberl, Peter Gumbsch, Noy Cohen, Robert M. McMeeking and Matthew R. Begley, “Post-buckling and dynamic response of angled struts in elastic lattices”, *Journal of the Mechanics and Physics of Solids*, Vol. 133, Article 103693, December 2019