



**Exponent**<sup>®</sup>  
Engineering & Scientific Consulting

## Aaron Freidenberg, Ph.D.

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### Professional Profile

Dr. Freidenberg specializes in engineering analysis of complex structures and the response of structures to extreme loading conditions, including earthquake, blast, and impact loading. The structures he has investigated have ranged from handheld drones made of polymer materials to multi-story steel and concrete civil structures. He has experience in cutting-edge failure analysis computer modeling and has used a variety of methods to validate the accuracy of the models with physical experiments. His work on pretensioned concrete and cold-formed steel have been published in engineering journals. Among his protective construction projects, include several for the Department of Defense (DoD).

Prior to joining Exponent, Dr. Freidenberg was an Assistant Professor in the Department of Civil and Mechanical engineering at the U.S. Military Academy in West Point, NY. At West Point, he taught a variety of mechanics courses, led research projects related to blast design, and ran advanced computer models using software such as LS-DYNA, many of which required the use of DoD high-performance computers. In his role as Associate Director for the Center for Innovation and Engineering at West Point, he developed partnerships with clients and other academic, industry, or government researchers including the Defense Intelligence Agency (DIA) and Army Research Lab (ARL).

Dr. Freidenberg is actively involved in the engineering community as a member of various professional and scholarly associations, including the Precast Concrete Institute, the American Society of Engineering Education, and the American Institute of Steel Construction's Structural Stability Research Council.

### Academic Credentials & Professional Honors

Ph.D., Structural Engineering, University of California, San Diego, 2013

M.S., Civil Engineering, Princeton University, 2009

B.S., Civil Engineering, University of Southern California, 2007

Superior Civilian Service Award, Department of the Army, 2019

Department Fellowship, UC San Diego Dept. of Structural Engineering, 2012-2013

Department Fellowship, Princeton University Dept. of Civil & Environmental Engineering, 2007-2009

### Academic Appointments

Visiting Assistant Professor, Manhattan College, 2013-2014

## Prior Experience

Assistant Professor, U.S. Military Academy, West Point, 2014-2019

## Professional Affiliations

Member, American Institute of Steel Construction (AISC)

Member, Precast Concrete Institute (PCI)

Member, American Society of Engineering Education (ASEE)

Reviewer, Sage Journals

## Publications

Freidenberg A, Milliman LR, Parmer B, Olaolorun G, Pape E, Durant B. Validation of Prestressed Concrete High-Fidelity Finite Element Analysis. *PCI Journal* 2019; 64(5): 30-42.

Drummond R, Sun C, Valkenburg A, Freidenberg A, Bruhl JC. Computer Predictions of Tunnel Response to Blast. *Proceedings, Structures Congress, Orlando, FL, 2019.*

Bruhl JC, Gash RJ, Freidenberg A, Conley CH, Moody PM. Helping Students Learn Engineering Mechanics Concepts Through Integration of Simulation Software in Undergraduate Courses. *Proceedings, ASEE Annual Conference, Salt Lake City, UT, 2018.*

Freidenberg A, Bruhl JC, Conley CH, Radow CL. High Fidelity Structural Analysis for Undergrad Structural Engineering Students. *Proceedings, Structures Congress, Fort Worth, TX, 2018.*

Chansuk, P, Freidenberg A, Quadrato CE, Rogers MM. Influence of Plate Stiffener Geometries on LTB Capacity. *Proceedings, Structural Stability Research Council (SSRC), Orlando, FL, 2016.*

Stewart LK, Freidenberg A, Hegemier GA. Design and Testing of Steel Stud Wall Systems for Blast Mitigation. *Proceedings, 13th Structures Under Shock and Impact (SUSI), New Forest, UK, 2014.*

Freidenberg A, Aviram A, Stewart LK, Whisler D, Kim H, Hegemier GA. Demonstration of Tailored Impact to Achieve Blast-Like Loading. *International Journal of Impact Engineering* 2014; 71: 97-105.

Stewart LK, Freidenberg A, Rodriguez-Nikl T, Oesterle M, Wolfson J, Durant B, Arnett K, Asaro RJ, Hegemier GA. Methodology and Validation for Blast and Shock Testing of Structures using High-speed Hydraulic Actuators. *Engineering Structures* 2014; 70:168-180.

Freidenberg A, Stewart LK, Hegemier GA. Advancements in Blast Simulator Analysis. *Proceedings, 84th Shock and Vibration Symposium (SAVE), Atlanta, GA, 2013.*

Freidenberg A, Lee CW, Durant B, Nesterenko VF, Stewart LK, Hegemier GA. Characterization of the Blast Simulator Elastomer Material Using a Pseudo-Elastic Rubber Model. *International Journal of Impact Engineering* 2013; 60:58-66.

Herning G, Garlock MEM, Freidenberg A. Comparison of Welded and Post-Tensioned Steel Moment-Resisting Frames. *Proceedings, Steel Structures in Seismic Areas (STESSA), Santiago, Chile, 2012.*

## Presentations

Freidenberg A. Cadet Simulation-Based Engineering. Harvey Mudd College Department of Engineering

seminar series. Claremont, CA, 2019.

Freidenberg A. Cadet Simulation-Based Engineering. U.S. Military Academy (USMA) seminar series. West Point, NY, 2018.

Sun C, Valkenburg A, Barron C, Freidenberg A. Underground Reinforced Concrete Structures Subject to Above-Ground Blast. 26th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2018.

Floam H, Hochfelder C, Lloyd J, Cummins C, Freidenberg A. Underbody Blast Protection: Service Academy Competition. 26th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2018.

Freidenberg A. Running a Finite Element Analysis on a DoD HPC. U.S. Military Academy (USMA) seminar series. West Point, NY, 2017.

Freidenberg A., Lee CW. Simulating Rubber Impact: Pseudo-Elastic Material Model vs. UMAT. 24th Annual ARL/USMA Technical Symposium (AUTS). Aberdeen Proving Ground, MD, 2016.

Freidenberg A. Advancements in Blast Simulator Analysis. Army Research Lab Weapon and Materials Research Directorate seminar series. Aberdeen Proving Ground, MD, 2016.

Freidenberg A. Simulation-Based Engineering using LS-DYNA. USMA Department of Civil & Mechanical Engineering seminar series. West Point, NY, 2014.