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Engineering & Scientific Consulting

Steven Kreuzer, Ph.D., P.E.

Senior Managing Engineer | Mechanical Engineering
Natick
+1-508-652-8549 | skreuzer@exponent.com

Professional Profile

Dr. Kreuzer specializes in stress analysis using both computational and experimental approaches, including finite element modeling and the design and execution of custom mechanical tests. He has applied his expertise to a range of engineering fields, including consumer electronics, consumer products, automotive, aerospace, energy storage, and biomedical applications.

Dr. Kreuzer provides expertise to clients seeking to combine experimental testing with insights gained from computational approaches.

While at the University of Texas at Austin, Dr. Kreuzer's doctoral research involved the development of simulation techniques for determining the mechanical properties of proteins and protein assemblies in healthy and diseased cells. As an undergraduate, Dr. Kreuzer's research focused on performing finite element analysis and computational fluid dynamics simulations to determine the mechanical environment of maturing and remodeling musculoskeletal tissues. As a doctoral student at the University of Texas at Austin, Dr. Kreuzer was a teaching assistant with 6 years of experience in laboratory courses focused on the design and implementation of mechanical tests.

Academic Credentials & Professional Honors

Ph.D., Mechanical Engineering, University of Texas, Austin, 2013

B.S.E., Mechanical Engineering, Case Western Reserve University, 2006

Licenses and Certifications

Professional Engineer Mechanical, California, #37852

Professional Affiliations

American Society of Mechanical Engineers (active member)

Publications

Kreuzer SM, Elber R. Coiled-coil response to mechanical force: Global stability and local cracking. Biophysical Journal 2013; 105:951-961.

Kreuzer SM, Moon TJ, Elber R. Catch bond-like kinetics of helix cracking: Network analysis by molecular dynamics and milestoning. Journal of Chemical Physics 2013; 139:121902.

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Kreuzer SM, Elber R, Moon TJ. Early events in helix unfolding under external forces: A milestoning analysis. Journal of Physical Chemistry 2012; 116:8662-8691.

Viswanath S, Kreuzer SM, Cardenas AE, Elber R. Analyzing milestoning networks for molecular kinetics: Definitions, Algorithms, and Examples. Journal of Chemical Physics 2013; 139:174105.

Anderson E, Kreuzer S, et al. Pairing computational and scaled physical models to determine permeability as a measure of cellular communication in micro- and nano-scale pericellular spaces. Journal Microfluidics & Nanofluidics 2008; 4:193-204.

Invited Presentations

Page C, Kreuzer, SM, Ansari F, Eason D, Hamed E, Watson H. Optimizing 3D printed components: a methodological approach to assessing print parameters on tensile properties, ANTEC Annual Meeting, Anaheim, CA, 2017

Kreuzer SM, Briant P, Ochoa J. The living heart model: comparison to static and dynamic in vivo measurements (updated), Abaqus Living Heart Project Annual Meeting, Washington DC, 2017

Kreuzer SM, Briant P, Ochoa J. The Living heart model: comparison to static and dynamic in vivo measurements, Abaqus Living Heart Project Annual Meeting, Washington DC, 2016

Kreuzer SM, Khatiblou EA, Zhou J, Liu CC, Marquez J, Moon TJ. Elastic network & finite element model vs. SMD to simulate structural protein mechanics. Biomedical Engineering Society Annual Meeting, Austin, TX, 2010.

Seminar Presentations

Kreuzer SM. Insights into the initiation of protein unfolding via a long helix. University of Texas Institute of Computational Sciences Molecular Biophysics Seminar Meeting, Austin, TX, April 2, 2012.

Kreuzer SM. Mechanical load transmission through proteins: An (alpha) helical case study. West Virginia University School of Medicine, Morgantown, WV, December 5, 2011.

Kreuzer SM. FERM mechanical response: A preliminary study. West Virginia University School of Medicine, Morgantown, WV, December 6, 2011.

Technical Meeting Presentations

Kreuzer SM, Otaibi TA, Moon TJ. Scaffold protein tethering ability under load: FAK's FERM domain mechanical properties v. binding site. Biophysical Society Annual Meeting, San Diego, CA, 2012.

Kreuzer SM, Liu CC, Khatiblou EA, Marquez J, Moon TJ. Propagation of load through proteins via steered molecular dynamics: Effect on Fluctuation Dynamics and Architecture. Biophysical Society Annual Meeting, Baltimore, MD, 2011.

Kreuzer S, et al. Permeability of cone's pericellular transport system is dominated by cell process fluid space. Biomedical Engineering Society Annual Meeting, Baltimore, MD, September 2005.

Kreuzer S, et al. Mechanobiological influences on endogenous bone tissue engineering. Biomedical Engineering Society Annual Meeting, Baltimore, MD, September 2005.

Estes B, Diekman B, Kreuzer S, et al. The influence of cell culture conditions and cell shape on the

chondro-genic potential of human adipose derived adult stem cells. Orthopaedic Research Society Annual Meeting, Washington, DC, February 2005.