

## SINAN KETEN

Civil & Environmental Engineering and Mechanical Engineering, Northwestern University  
2145 Sheridan Road, Evanston, IL 60208-3109, USA, Tel: (847) 491-5282, Fax: (847) 491-4011  
Email: [s-keten@northwestern.edu](mailto:s-keten@northwestern.edu)

### Publications

#### Five Principal Publications

1. S. Keten, Z. Xu, B. Ihle, M. J. Buehler, "Nanoconfinement controls stiffness, strength and mechanical toughness of  $\beta$ -sheet crystals in silk", *Nature Materials*, 2010, 9, p. 359-367.
2. S. Keten and M.J. Buehler, "Geometric confinement governs the rupture strength of H-bond assemblies at a critical length scale". *Nano Letters*, 2008, 8(2): p. 743-748.
3. M. J. Buehler, S. Keten, "Colloquium: Failure of molecules, bones, and the Earth itself", *Reviews of Modern Physics*, 2010, 82(2): p. 1459-1487. Highlighted by M. Buchanan, "Learning from Failure", *Nature Physics*, 2009, 5(705).
4. S. Keten, M. J. Buehler, "Atomistic model of the spider silk nanostructure", *Applied Physics Letters*, 2010, 96: p. 153701 (Cover article).
5. S. Keten and M.J. Buehler, "Strength limit of entropic elasticity in beta-sheet protein domains". *Physical Review E (Statistical, Nonlinear, and Soft Matter Physics)*, 2008, 78(6): p. 061913.

#### Other Journal Publications

6. S. Keten, M. J. Buehler, "Nanostructure and molecular mechanics of dragline spider silk protein assemblies", *Journal of the Royal Society – Interface*, in press, published online June 2, 2010, doi: 10.1098/rsif.2010.0149.
7. Andrea Nova, Sinan Keten, Nicola Pugno, Alberto Redaelli, and Markus J. Buehler, "Molecular and Nanostructural Mechanisms of Deformation, Strength and Toughness of Spider Silk Fibrils", *Nano Letters*, 2010, 10(7): p. 2626-2634.
8. R. Paparcone, S. Keten, M.J. Buehler, "Nanomechanical properties of Alzheimer's A $\beta$ (1-40) amyloid fibrils under compressive loading", *Journal of Biomechanics*, 2010, 43(6): p. 1196-1201.
9. M. Srinivasan, S.G.M. Uzel, A. Gautieri, S. Keten, M. J. Buehler, "Alport Syndrome mutations in type IV tropocollagen alter molecular structure and nanomechanical properties". *Journal of Structural Biology*, 2010, 168(3): p. 503-510.
10. S. Keten, J. F. R. Alvarado, S. Müftü and M. J. Buehler, "Nanomechanical characterization of the triple  $\beta$  -Helix domain in the cell puncture needle of bacteriophage T4 Virus", *Cellular and Molecular Bioengineering*, 2009, 2(1): p. 66-74.
11. T. Ackbarow, S. Keten, and M.J. Buehler, "A multi-timescale strength model of alpha-helical protein domains". *Journal of Physics: Condensed Matter*, 2009, 21(3): p. 035111.

12. M. J. Buehler, S. Keten, and T. Ackbarow, "Theoretical and computational hierarchical nanomechanics of protein materials: Deformation and fracture". *Progress in Materials Science*, 2008, 53(8): p. 1101-1241.
13. S. Keten and M.J. Buehler, "Asymptotic strength limit of hydrogen bond assemblies in proteins at vanishing pulling rates". *Physical Review Letters*, 2008, 100: p. 198301.
14. S. Keten and M.J. Buehler, "Large deformation and fracture mechanics of a beta-helical protein nanotube: Atomistic and continuum modeling". *Computer Methods in Applied Mechanics and Engineering*, 2008, 197(41-42): p. 3203-3214.
15. M. J. Buehler and S. Keten, "Elasticity, strength and resilience: A comparative study on mechanical signatures of  $\alpha$ -Helix,  $\beta$ -sheet and tropocollagen domains". *Nano Research*, 2008, 1(1): p. 63-71.
16. T. Ackbarow, X. Chen, S. Keten, M. J. Buehler, "Hierarchies, multiple energy barriers, and robustness govern the fracture mechanics of alpha-helical and beta-sheet protein domains". *Proceedings of the National Academy of Sciences*, 2007, 104(42), p. 16410-16415 (Cover article).
17. H. Lus, C.O. Aydin, S. Keten, H. Unsal, A.R. Atilgan, "El Farol revisited", *Physica A Statistical Mechanics And Its Applications*, 2005, 346 (3-4): p. 651-656.
18. Keten, S. J. Bertaud, D. Sen, Z. Xu, T. Ackbarow, M.J. Buehler, "Multi-scale modeling of biological protein materials – deformation and fracture ", *Trends in Computational Nanomechanics: Transcending Time and Length Scales* (series: challenges and Advances in Computational Chemistry and Physics), Springer (Ed. T. Dumitrica), 2010, 9: p. 473-533.

### Conference Proceedings

19. S. Keten, M. J. Buehler, "A Critical Strand Length Controls the Strength of Beta-Sheet Protein Structures", ICHMM, Huangshan, China, 2008.
20. S. Keten and M. J. Buehler, "Asymptotic Strength Limit of Hydrogen Bond Assemblies in Proteins at Vanishing Pulling Rates", MRS Fall Meeting, Boston, MA, 2007.
21. S. Keten, M. J. Buehler, "Geometric confinement governs the rupture strength of H-bond assemblies at a critical length scale", MRS Fall Meeting, Boston, MA, 2007.