**Faculty Profile: Santiago Solares**

Professor

Department: Mechanical Engineering

School: School of Engineering

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Phone: 202-299-2894

Education: Ph.D., Chemical Engineering, California Institute of Technology, 2006

**Research Interests and Expertise:**

Scanning probe microscopy, nanoscale mechanics, surface science, multiscale modeling (quantum mechanics, molecular dynamics, continuum mechanics), soft viscoelastic materials (polymers and biological materials).

**Biography:**

Santiago Solares joined The Catholic University of America in 2023, prior to which he held faculty positions at The George Washington University (Mechanical and Aerospace Engineering, 2014-2023) and at the University of Maryland, College Park (Mechanical Engineering, 2006-2014). His research program spans scanning probe microscopies, nanoscale mechanics, surface science, multiscale modeling and viscoelastic materials, especially polymers and biological materials. He has published over 100 peer reviewed journal articles and is the recipient of the NSF and DOE CAREER awards. His teaching interests include multi-scale simulation methods (atomistic to continuum), thermodynamics, mechanics and dynamics. Before joining academia, he held various technical and management positions with Pepsi-Cola International and Mars Incorporated.

**Five Selected Papers:**

1. McCraw, M.R.; Uluutku, B.; Solomon, H.D.; Anderson, M.S.; Sarkar, K.; Solares, S.D.; “Optimizing the accuracy of viscoelastic characterization with AFM force-distance experiments in the time and frequency domains,” *Soft Matter,* **2023,** *19,* 451-467.
2. Uluutku, B.; McCraw, M.R.; Solares, S.D.; “Direct measurement of storage and loss behavior in AFM force-distance experiments using the modified Fourier transformation,” *J. Appl. Phys.* **2022,** *131,* 165101.
3. Maiti, R.; Patil, C.; Saadi, M.A.S.R.; Xie, T.; Azadani, J.G.; Uluutku, B.; Amin, R.; Briggs, A.F.; Miscuglio, M.; Van Thourhout, D.; Solares, S.D.; Low, T.; Agarwal, R.; Bank, S.R.; Sorger, V.J.; “Strain-engineered high-responsivity MoTe2 photodetector for silicon photonic integrated circuits,” *Nature Photonics* **2020,** *14,* 578-584.
4. López-Guerra, E.A.; Shen, H.; Solares, S.D.; Shuai, D.M.; “Acquisition of time-frequency localized mechanical properties of biofilms and single cells with high spatial resolution,” *Nanoscale* **2019,** *11,* 8918-8929.
5. Klimov, N.N.; Jung, S.; Zhu, S.; Li, T.; Wright, C.A.; Solares, S.D.; Newell, D.B.; Zhitenev, N.B.; Stroscio, J.A.; “Electromechanical properties of graphene drumheads,” *Science* **2012,** *336,* 1557-1561.

**Professional Activities (please also include STEM education/diversity/outreach activities)**

* Member of the Steering Committee of the International Conference on Noncontact Atomic Force Microscopy (AFM) during 2013-2020, and Chair of the 2013 conference held in Washington, D.C. This is the most prestigious international conference dedicated exclusively to AFM.
* Co-organizer of symposium on Multifunctional and Multifrequency Scanning Probe Microscopy at the 2017 Fall Meeting of the Materials Research Society.
* Co-organizer of symposia on dynamic atomic force microscopy within the 2011 & 2012 International Design Engineering Technical Conference (ASME).
* Introduction of the first fully atomistic-continuum multi-scale simulation courses at the University of Maryland’s and at The Catholic University of America’s Mechanical Engineering Departments.
* Extensive corporate technical training on manufacturing processes, particularly cereal extrusion, industrial drying, food coating, fluid and solid transport systems.
* Participation in various outreach STEM events for underrepresented student groups.