

Bioengineering Faculty Search, College of Engineering, University of Toledo

Multifunctional Materials for Biomedical Applications

Dr. Santiago Orrego

*Postdoctoral Fellow, Hopkins Extreme Materials Institute &
Department of Mechanical Engineering, Johns Hopkins University*

Multifunctional materials play a crucial role in the next-generation of biomedical devices by having the ability to perform multiple functions. Numerous examples of multifunctional materials can be found in the nature containing sensing, healing, adaptation, actuation, and other functions built into the primary structures. The ability for materials to respond to their environment in a useful manner has broad technological impact. There is a gap in our current understanding of how to translate these qualities into the development of new advanced materials. In this talk, I will present our recent advances on different material systems with intriguing functionalities employed in biomedical applications. Specifically, I will describe the performance of novel set of dental materials used in restorations with the ability to repel biofilm. We designed a resin composite with embedded multi-agents containing acid neutralizer and bacteria repelling nanoparticles. Results showed the prevention of bacterial degradation and improved durability. Furthermore, I will present our recent efforts on the design of a material system with the ability to self-stiffen and self-heal in response to external loading utilizing biomimetic pathways.

Where: SSOE Seminar Room, NI 1027

When: Friday, September 8, 2017

Time: 11:30 – 12:30 pm

Santiago Orrego is a Postdoctoral Fellow at Johns Hopkins University in the Department of Mechanical Engineering and the Hopkins Extreme Materials Institute. His research interests lie in the realm of bio-inspired multifunctional materials. He is particularly interested in developing novel advanced materials with tailored functionalities for biomedical applications to improve healthcare. Santiago received his Ph.D. degree in Mechanical Engineering from the University of Maryland, Baltimore County. He received his B.S. and M.S. degrees in Mechanical Engineering from EAFIT University in Medellín, Colombia. His ongoing research explores a novel pathway to design self-stiffening and self-healing material systems. He has several journal publications and has made presentations at numerous conferences and workshops.