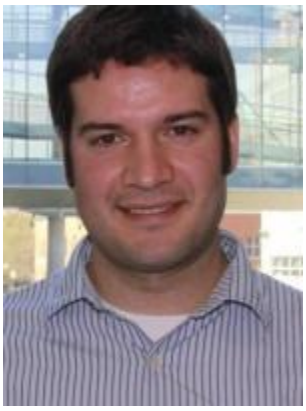
“DNA based Nanomechanical Devices”

Carlos Castro, Assistant Professor, Mechanical & Aerospace Engineering, The Ohio State University

Time: *3:30 pm, Friday, November 20, 2015;*
Location: *MER Room 2.114, 10100 Burnet Road Building 160, Austin TX 78758*



Abstract: Structural DNA nanotechnology is a rapidly emerging field with great potential for applications such as single molecule sensing, drug delivery, and manipulating molecular components. However, relative to natural biomolecular machines, the functional scope of DNA nanotechnology is limited by an inability to design dynamic mechanical behavior such as complex motion, conformational dynamics, or force generation. A major focus of our lab is to develop nanomechanical devices by adapting methods used in macroscopic machine design. Prof. Castro will discuss his laboratories’ recent work to develop DNA nanostructures with programmable 1D, 2D, and 3D motion as well as dynamic nanostructures with controlled conformational dynamics. A major goal of this work is to develop devices where dynamic behavior can be exploited to probe nanoscale physical properties or interactions (e.g. molecular forces). Prof. Castro will highlight two ongoing applications that focus on implementing dynamic DNA devices to measure depletion forces due to molecular crowding and to study the structural dynamics of biomolecular complexes

Prof. Castro will also give an overview of his path to becoming an Assistant Professor at The Ohio State University. The talk will be followed by a Q&A with the audience.

Bio: Professor Castro received his Bachelor’s and Master’s degrees in Mechanical Engineering both in 2005 from The Ohio State University and his PhD in Mechanical Engineering from the Massachusetts Institute of Technology in 2009. He then spent 1.5 years as an Alexander von Humboldt post-doctoral fellow at the Technische Universität München working in the field of DNA nanotechnology. Dr. Castro returned to The Ohio State University in 2011 as an Assistant Professor in the Department of Mechanical and Aerospace Engineering. He has established a state-of-the-art laboratory focused on developing self-assembled DNA nano-devices to probe biophysical function of molecular and cellular systems. His lab has recently published pioneering work in the design of DNA nanomachines with complex motion and mechanical behavior, which they are currently adapting as tools to probe physical properties of molecular systems.