X-in-the-Loop Engine Test Bed

Relevance to the Automotive Industry:	A new hybrid engine test bed is developed as part of a cooperation with AVL. AVL is the world's largest independent company for the development of powertrain systems with internal combustion engines as well as instrumentation and test systems.
Research Location:	TUD Institute for Internal Combustion Engines and Powertrain Systems (VKM)
Homepage (Engl.):	http://www.vkm.tu-darmstadt.de
Faculty Mentor:	Prof. Dr.techn. Christian Beidl
Faculty Mentor Email:	beidl@vkm.tu-darmstadt.de
Graduate Mentor:	Hauke Maschmeyer, M.Sc.
Graduate Mentor Email:	maschmeyer@vkm.tu-darmstadt.de
Project Description: May 21 - Jul 12, 2013; (8 weeks, 40h/week)	The Institute for Internal Combustion Engines and Powertrain Systems (VKM) has developed their own hybrid engine operating strategy. Hence, one of their ongoing efforts is to continuously improve this strategy's functions and the underlying MATLAB/Simulink model. The NSF REU student will work on the institute's x-in-the-loop hybrid engine test bed to assist in this ongoing improvement effort. In this test bed, real hardware components, such as the internal combustion engine, clutch and electric drive including the motor, inverter and battery simulator, are combined with an AVL InMotion based virtual vehicle and 3D-environment simulation. PHASE 1: During the first two weeks, the NSF REU students will become familiarized with the subject and scope out the specifics of the project. This includes performing a relevant literature review. PHASE 2: During the next 4 weeks, the NSF REU student will perform simulations and validation tests using the engine test bed. PHASE 3: During the final two weeks, the NSF REU student will generate a presentation, report, and parts of a conference paper under the supervision of the graduate mentor.
Target publications:	• 5th International Symposium on Development Methodology 2013
Necessary Skills/ Knowledge:	• MATLAB
Desirable Skills/ Knowledge:	
Additional Online Resource(s):	

NSF REU Students must have completed at least two semesters of engineering studies prior to the proposed summer research, and they must have at least one semester remaining before they can earn their BS in Engineering.