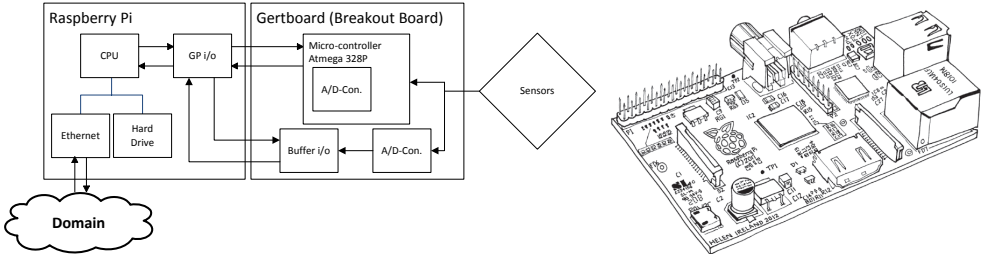


Raspberry Pi Multipurpose Measurement and Control Device

Relevance to the Automotive Industry:	Hydrogen is expected to substitute gasoline as the energy carrier. In order to convert the chemically stored energy to kinetic energy, an energy converter, such as a fuel cell, is needed. With our fuel cell test bench (FuelCon Evaluator C 100), we are able to perform long-term stability measurements, as well as performance characterizations of single cells and stacks designs.	
Research Location:	TUD Thermische Verfahrenstechnik (TVT)	
Homepage (Engl.):	http://www.tvt.tu-darmstadt.de/	
Faculty Mentor:	Prof. Dr.-Ing. Manfred J. Hampe	
Faculty Mentor Email:	hampe@tv.tu-darmstadt.de	
Graduate Mentor:	Dipl.-Ing. Timur Johann Kazdal	
Graduate Mentor Email:	kazdal@tv.tu-darmstadt.de	
Project Description:	<p>The objective for this NSF REU project is to add humidity sensors in the exhaust stream of the fuel-cell test-bench, and to add a small, credit-card sized Raspberry Pi computer as an auxiliary measurement and control device:</p> <p>May 21 - Jul 12, 2013; (8 weeks, 40h/week)</p>  <p>This effort will organized in three phases:</p> <p>PHASE 1: During the first two weeks, the NSF REU student will become familiar with the subject and scope out the specifics of the project. The student will be provided with a Raspberry Pi computer and will explore how it operates and how it can be used for data collection and control: After an introduction to the Python programming language, the NSF REU student will start building experimental circuits to obtain a basic, practical knowledge of measurement and control.</p> <p>PHASE 2: During the next 4 weeks, the NSF REU student will design, build, and test the target circuitry and user interface.</p> <p>PHASE 3: During the final two weeks, the NSF REU student will collect results and generate a presentation and report. The report will contain all necessary project documentation to facilitate continued work, and it will contain materials suitable towards a conference or journal publication.</p>	
Target publications:	<ul style="list-style-type: none"> • Journal of Power Sources 	
Necessary Skills/ Knowledge:	<ul style="list-style-type: none"> • MATLAB • Programming, Python • Linux (Bash) 	
Desirable Skills/ Knowledge:	<ul style="list-style-type: none"> • Micro controller programming experience • HTML 	
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.