

# Development of a Validation Methodology for Vehicle Lateral Dynamics Simulation Models

Relevance to the Automotive Industry:	Computer simulation models are utilized in nearly every product development process in automotive industry. One of these utilization fields is prediction of the response of existing or proposed vehicles. Although simulation environments, measurement tools, and mathematical foundations are well established, the methodical aspect concerning the validation is still lacking. This project aims to explore the theory behind the relationship between the reality, experimentation, and the simulation of vehicle dynamics, and to develop a procedure-based approach to validation efforts.	
Research Location:	TUD Fahrzeugtechnik (FZD)	
Homepage (Engl.):	<a href="http://www.tu-darmstadt.de/fzd/index_en.html">http://www.tu-darmstadt.de/fzd/index_en.html</a>	
Faculty Mentor:	Prof. Dr. rer. nat. Hermann Winner	
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Project Description:	The aim of the project is demonstrate the proposed validation framework. Selected ISO-3888 (obstacle avoidance) and ISO-7401 (step response and sine sweep) maneuvers will be analyzed and executed on a test vehicle. The experimental input will be used to run the simulations of the maneuvers. The experimental results will be processed and assessed according to the proposed validation framework.	
May 23 - Jul 15, 2011; (8 weeks, 40h/week)		
Target publications:	<ul style="list-style-type: none"> <li>• EAEC European Automotive Congress 2013</li> <li>• FISITA World Automotive Congress 2012</li> <li>• OTEKON 2012</li> <li>• SAE World Congress 2012</li> </ul>	
Necessary Skills/ Knowledge:	<ul style="list-style-type: none"> <li>• MATLAB &amp; Simulink</li> <li>• Vehicle Dynamics and Handling</li> <li>• Driver's License (ability to drive vehicle with manual transmission)</li> </ul>	
Desirable Skills/ Knowledge:	<ul style="list-style-type: none"> <li>• CarMaker</li> <li>• Fundamental Statistics</li> <li>• Fourier Analysis</li> </ul>	
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.