Pavement Surface Map Verification

Relevance to the Automotive Industry:	Accurately measuring the pavement surface (the true input into the vehicle) is critical to understand vehicle responses (forces, stresses…) and ultimately affects vehicle designs. However, the input to the vehicle models must be accurate and precise. This enables more product testing, faster, sooner, and at less expensive than what is possible in physical prototyping and product testing. The result is faster product introduction with improved quality.
Research Location:	VT Vehicle Terrain Performance Laboratory (VTPL)
Homepage (Engl.):	http://www.me.vt.edu/VTPL
Faculty Mentor:	Prof. John B. Ferris, Ph.D.
Faculty Mentor Email:	jbferris@vt.edu
Graduate Mentor:	Savio Pereira, PhD Candidate
Graduate Mentor Email:	psavio5@vt.edu
Project Description: Jun 04 - Aug 10, 2018 (10 weeks, 40 h/week)	The mission of the Virginia Tech Vehicle Terrain Performance Laboratory (VTPL) is to improve the performance of ground vehicle systems by studying their interactions with the pavement. Toward this end, measuring the pavement surface (the true vehicle input) is critical and verifying these measurements is an integral part of this step. The proposed NSF REU project is the verification of pavement surface measurements by helping to develop test standards, accuracy and precision requirements, and carrying out our validation tests on real measurements systems. **PHASE A** (2-3 weeks): During this introduction phase, the NSF REU student will review relevant research, and investigate existing test procedures, analysis software, statistical methods, and hardware. This will culminate in a final research plan and proposed equipment orders (as needed). **PHASE B** (4 weeks): Next, the student will conduct experimental testing using existing test methods and accuracy and precision requirements. **PHASE C** (2 weeks): Next, the student will refine test methods and accuracy and precision requirements based on results from research and experimental testing. **PHASE D** (1-2 weeks): Finally, the NSF REU student will document the research performed, prepare a written report to support subsequent publications, and deliver an end-of-summer presentation on the research performed.
Target publications:	• 2019 SAE World Congress
Necessary Skills/ Knowledge:	• Basic understanding of probability and statistics, willingness and competence in teamwork, some hands-on testing experience
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.