**MarTREC UTC Project Information Form**
USDOT Tier 1 University Transportation Center
Agency ID or Contract Number DTRT13-G-UTC50

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| Project Title: Predicting Soil Type from Non-destructive Geophysical Data using Bayesian Statistical Methods |
| Project Abstract (Brief Description): The goal of the original research project was to develop a rapid, non-destructive geophysical testing program that can be used to proactively evaluate levees. A series of geophysical field trials were conducted to determine the most accurate and efficient methods and the best parameters for detecting various features or defects within levees. Of the available techniques, electrical resistivity measurements and surface wave methods were determined to be the most advantageous in terms of capturing features of interest. While these are the best indicators of a subsurface condition, neither method was able to provide a confident prediction of soil type when used alone. For resistivity in particular, a wide range of predictor values was found associated to a given soil type, leading to poor uncertainty quantification. Even though a laboratory study was conducted to better understand the influence that geotechnical parameters have on a soil's measured electrical resistivity, the low sample size made it difficult to predict soil type using a traditional statistical regression or classification framework with sufficient power. A lower sample size can also lead to biased parameter estimates inhibiting a study of their relative importance. |
| Describe Implementation of Research Outcomes: A more accurate and interpretable predictor of soil type is critically needed in order to assess the many miles of undocumented levees scattered across the United States. The proposed method would allow this information to be gathered non-destructively which would save both time and money. |
| Impacts/Benefits of Implementation (actual, not anticipated)<br>*To be determined upon conclusion of the project:* |
| Web Links: martrec.uark.edu |
| Budget (Funding) Amounts & Source(s) (US DOT +Match(s) =Total Costs): $38,018+$19,034= $57,052 |
| Project Start and End Dates: 01/01/18-08/17/18. Project complete. |
| Principal Investigator(s) and Contact Information: Michelle Bernhardt, Ph.D. University of Arkansas and Clint Wood, Ph.D. University of Arkansas |
| Principal Investigator Institution (University): University of Arkansas |