2018 Winning Entry by Mitchell Young

1. **What is the purpose of the project?**
   The attached is a subset of a larger research project currently being conducted in the Human-Machine Interfaces (HMI) Laboratory on campus. The scope of that experiment is to quantify deficiencies of sensory information through the measurement of physiological responses such as Electrodermal Activity (EDA). This knowledge could prove useful in designing sensory feedback systems, such as prostheses.

   The attached project was created to provide future HMI research students with essential information about EDA measurements. The document synthesizes current EDA literature to give a conceptual understanding of the subject and records our research team's own methodologies for accurate measurements.

2. **What skills were learned and developed during the literature review?**
   This project required an intensive analysis of technical papers, forcing an integration between critical research skills and knowledge of physics and physiology. As a student, I've written several research papers in humanities-based classes but have had little experience applying that research process toward scientific endeavors. This project required coupling critical reasoning from previous research projects with a knowledge of electrical circuits and physiological feedback to comprehend each document and its relevancy to our research project. Through this, I learned how to adapt my knowledge of engineering principles to critically inspect and analyze technical research documents.

3. **How were appropriate sources selected?**
   Sources were needed for three main purposes: to understand the underlying physics and physiology of EDA, to learn the methodology behind taking accurate EDA measurements, and finally, to perform metrological analyses on our system's uncertainty. When analyzing the literature, the first criterion we searched for was if the document provided insight to any of those goals. Then, the reliability of the source was analyzed through the credibility of both the author and the publishing establishment. After verification of credibility, the source was integrated with other sources to provide as much insight to our project as possible.

4. **What methods were used to synthesize sources?**
   Synthesizing sources together to the main points of interest was a time-consuming process. We started by reading the relevant sources two to three times each for comprehension. Then, we condensed each source into a simple summary with its main points. From there, we paired similarities between sources together. For the most part the research proved to be consistent, with a few minor discrepancies, such proper sensor placement on one's skin. For these variances, we were able to physically attempt both methods with our own measurement system and determine which provided better results.

5. **What was most challenging with the information-gathering?**
   The most difficult challenge we faced was in compiling the information from the literature review down into information that was directly relevant to the EDA measurement system that we are using for the experimentation in our laboratory. The different sources occasionally recommended methodologies with minor variations from the other sources. To overcome these challenges, we evaluated and compared the measurement suggestions from all relevant sources and selected the most common recommendations. From there, we empirically tested the various suggestions to select the methods that provided the most consistent measurements for our experiment.