

Senior Design Project Description

Company Name	EPRI	Date Submitted	12/07/2020
Project Title	Phase 2: Design of a Proof-of-Concept Tool to Assess Welding Quality using Sound or Vibration (EPRI_WELDS2)	Planned Starting Semester	Spring 2021

Personnel

Typical teams will have 4-6 students, with engineering disciplines assigned based on the anticipated Scope of the Project.

Please provide your estimate of staffing in the below table. The Senior Design Committee will adjust as appropriate based on scope and discipline skills:

Discipline	Number	Discipline	Number
Mechanical	1	Electrical	1
Computer	1	Systems	1
Other (multi-disciplinary or systems)			

Company and Project Overview:

The Electric Power Research Institute (EPRI) conducts research, development, and demonstration projects for the benefit of the public in the United States and internationally. As an independent, nonprofit organization for the public interest, we focus on electricity generation, delivery, and use in collaboration with the electricity sector, its stakeholders and others to enhance the quality of life by making electric power safe, reliable, affordable, and environmentally responsible.

EPRI has collaborated with the electricity sector and its stakeholders since 1972 and our membership has grown to represent approximately 90% of the electric utility revenue generated in the United States and extends to participation in more than 35 countries. The worldwide membership that supports our work comprises more than 1,000 organizations. While most members are electric utilities, others are businesses, government agencies, regulators and public or private entities engaged in some aspect of the generation, delivery, or use of electricity.

Through their advisory roles in EPRI, its research sectors and programs, EPRI members help inform the development of EPRI's annual research portfolio, identify critical and emerging electricity industry issues, and support the application and technology transfer of EPRI's research and development.



UNC CHARLOTTE

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This project will be related to developing methods for providing automated adaptive feedback control to a welding system to ensure optimal welding conditions using acoustics and vibration sensors.

Project Requirements:

Phase 1 of this project (EPRI_WELDS) was successfully completed by UNCC students in 2020, and included capturing acoustics and vibration sensor data with microphones and accelerometers to detect anomalies during welding.

The objective of Phase 2 for this project will be to develop a computer-based program/interface that uses the acoustics/vibration sensor data to produce indicators and suggestions when anomalies occur during welding. The students would need to spec out and design the hardware and design the software (read and display data, feedback algorithms, etc). A verification testing protocol would also be developed and implemented.

Expected Deliverables/Results:

- Development of computer-based user interface that processes the acoustics/vibration weld sensor data and provides indications when weld anomalies are occurring. Additionally, the program/interface will provide suggestions to address anomalies during welding that will preemptively prevent the occurrence of weld defects (e.g., lack of fusion)
- Verification testing of developed interface.

Disposition of Deliverables at the End of the Project:

Delivered to EPRI after the conclusion of the Expo.

List here any specific skills, requirements, specific courses, knowledge needed or suggested (If none please state none):

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