National Science Foundation (NSF)
Industry/University Collaborative Research Center for
**Intelligent Maintenance Systems**

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# Laura Henkel Pahren

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EDUCATION

**PhD Candidate** • Mechanical Engineering • GPA 3.84/4.00
University of Cincinnati, Cincinnati, OH, USA • Expected May 2020
» Area of Focus: Prognostics and Health Management
Advisor: Professor Jay Lee

**Master of Science** • Mechanical Engineering • GPA 3.84/4.00
University of Cincinnati, Cincinnati, OH, USA • April 2017

**Bachelor of Science** • Mechanical Engineering • GPA 3.42/4.00
The Ohio State University, Columbus, OH • May 2014

SKILLS

MATLAB, LabVIEW, R, SolidWorks, OpenSim, Python, Mathematica, EES, and Made2Manage

CURRENT RESEARCH EXPERIENCE

Graduate Researcher
NSF I/UCRC for Intelligent Maintenance Systems (IMS)

Developing Prognostics and Health Management (PHM)-based analytical tools with research partners in the medical field including:

• **University of Cincinnati Neuro Intensive Care Unit**
  - » Advancing the understanding of relationships among neurological signals from comatose patients with severe, acute traumatic brain injury for the long-term goals to reduce secondary brain injuries and engineer a non-invasive brain monitoring strategy.
  - » Analyzed cortical EEG through time, frequency and wavelet techniques.
  - » Leveraged neural-network based Self-Organizing Map (SOM) to successfully classify above or below threshold mean peak ICP values using only cortical EEG features.

• **University of Cincinnati Neurosurgery**
  - » Developing algorithms to detect electrocorticography (ECoG) phenomena of spreading depolarization in traumatic brain injury patients.
  - » Researching machine learning techniques to find common data elements in scalp EEG in relation to ECoG spreading depolarizations to provide this important knowledge to clinicians treating patients who

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do not have a craniectomy.

• **University of Cincinnati Intensive Care Unit**
  - » Designing a predictive strategy to forecast the onset of delirium in the intensive care unit using scalp EEG in order to reduce patient mortality rates and hospital costs.
  - » Conducting both temporal and spatial measurements to quantify individual channel variables, as well as EEG connectivity measures.

WORK EXPERIENCE

**Predictronics** • Data Analyst • January 2016 – Present
- » Developing modular analytical software for exploration of new data sets and improved customer deliverables.

**TechSolve** • Data Analyst Intern • May 2015 – Aug. 2015
- » Developed LabVIEW data acquisition system for horizontal milling machine with MTConnect data communications protocol for tool condition monitoring system in web-based format.
- » Expanded MTConnect protocol to Prognostic Health Management (PHM) discipline by magnifying the scope of information that can be communicated.

**Neuromuscular Biomechanics Lab** • Researcher • June 2012 – Nov. 2013
- » Performed load testing on animal specimens' knees to isolate high stress regions due to synthetic subchondral defects.
- » Established control muscle constraints for biomechanic simulations, leading to acknowledgement in publication: "Gluteus maximus and soleus compensate for simulated quadriceps atrophy and activation failure during walking."

RELEVANT COURSEWORK

Introduction to Data Science, Applied Fast Fourier Transform, Biomedical Image and Signal Processing, Monte Carlo Methods, Math Statistics, Quality Control.

HONORS/ AWARDS

NCAA Division I Swimmer
Dean's List
National Society of Leadership and Success inductee
Phi Sigma Theta National Honor Society inductee
Texnikoi (Ohio State Engineering Honorary) inductee