PROJECT TITLE: Forecasting Electric Energy Demand

FACULTY NAME: Richard J. Povinelli

STUDENT NAME: Greg Merkel

TIMEFRAME OF PROJECT: January – December, 2014

RESEARCH SUMMARY: This project extended GasDay forecasting into new energy domains, specifically electric load forecasting. New electric forecasting algorithms were developed that have reached state-of-the-art in electric load forecasting accuracy (~3% error). Mr. Merkel is also participating in the IEEE PES energy forecasting competition.

RESEARCH OUTCOME: Mr. Merkel has developed new electric forecasting algorithms and designed a “committee of experts” to merge multiple forecasts. He has conducted cross validation testing to insure that the results are statistically significant, and he has used tools to identify the appropriate order of ARMAX models for forecasting electric load demand. He analyzed the forecasting errors by looking at the largest contributors to the forecasting error, using Gaussian mixture models and principle component analysis.

As part of the energy forecasting competition Mr. Merkel will be submitting a conference paper to the 2015 IEEE Power and Energy Society General Meeting.

LOCATION OF RESEARCH ACTIVITIES: Olin Engineering Building, rooms 534 and 540

COLLEGE RESOURCES: Lab space (Olin Engineering Building, rooms 534 and 540), GasDay computer cluster

COMMENTS: Based on his COE Undergraduate Research Program experience, Mr. Merkel is planning on pursuing graduate studies. During the summer, he took the GRE as part of the process for applying to graduate schools.