



West Texas A&M  
University™



**Joshua Partheepan, Ph.D.**  
Assistant Professor of Power  
Systems Engineering

### Research Areas and Expertise

Hydrogen Energy Storage  
Renewable Energy System  
Modeling  
Design and Development of  
Oxy-Hydrogen Combustion  
Systems  
Thermodynamic Power Cycle  
for Oxy-Hydrogen Combustion  
and Model Optimization

### Contact

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<http://bit.ly/2qagCZ4>



## Electrical Engineering

### Wind Turbine Research Interest

#### *Energy System Modeling*

Energy production using renewable resources is essential for the future; however most of the renewable resources are non-dispatchable in nature and careful consideration must be taken while operating and connecting the renewable energy generation system to grid so that the grid will be sustainable in nature. One of the key strategies to make the renewable energy generation system more predictable is understanding its operational characteristics.

Using collaborative resources between WTAMU and UL, it is possible to install any kind of wind turbine, constantly monitor the energy produced by the system, predict its performance, and identify the factors affecting the performance of the turbine, which can be used for improving the design of the system. From the acquired data during testing, a generalized model can also be developed, which can predict the energy output from the system depending on the weather forecast, which is crucial for grid operators.

#### *Energy Storage*

The major technical challenges that need to be addressed for sustainable operation of grid with high penetration from renewable energy sources in the future are maintenance of power quality and grid stability. Energy storage plays a vital role in resolving the problem. WTAMU is involved in developing a cost effective hydrogen energy storage system, which includes an electrolyzer for converting the surplus and off peak cheap electrical energy into hydrogen, hydrogen storage tanks for storing the hydrogen from hours to several months and WT's proprietary gas turbine cycle which effectively converts hydrogen back to electricity in an efficient and cost effective manner. WT is currently involved in research and development of oxy-hydrogen combustion chambers for gas turbine systems and optimization of thermodynamic cycles which uses oxy-hydrogen combustion.

### Professional Profile

Dr. Partheepan joined the School of Engineering, Computer Science, and Mathematics in 2017. He has a bachelor's degree in Electrical and Electronics Engineering from Anna University, India, a master's degree in Power Plant Technologies from University of Strathclyde, UK, and a Ph.D. in Agriculture and Systems from West Texas A&M University, USA. During his undergrad program, he did various in-plant training in power plants, coal mines, and transmission and distribution stations. After his undergraduate degree, he practiced for six months in the field of electrical installation and automation related to diesel electric generators before returning to graduate school. During his graduate studies, his research was primarily focused on modeling renewable energy generation and hydrogen energy storage systems.

### Academic Research

Dr. Partheepan's research interests include hydrogen energy storage and renewable energy system modeling. This includes fundamental research on design and development of oxy hydrogen combustion systems for steam generation, operation characteristics of steam injected gas turbines, modeling of thermodynamic power cycle for oxy-hydrogen combustion, and systems model optimization.



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## Electrical Engineering

### Education

- Ph.D. in Agriculture and Systems, West Texas A&M University, Canyon, USA (Fall 2014 – Fall 2016)
- M.Sc. in Power Plant Technologies, University of Strathclyde, Glasgow, UK (Fall 2012 – Summer 2013)
- B.E. Electrical and Electronics Engineering, Maharaja Engineering College, Coimbatore India (Fall 2008 – Spring 2012)

### Publications

- Partheepan, J., Rogers, W. J. (2015, Nov). Hydrogen as Fuel for Steam Injected Gas Turbine Power Plant. Poster session presented at: The Fuel Cell Seminar and Energy Exposition, Los Angeles, USA.
- Partheepan, J., Rogers, W. J. (2015 Dec). Hydrogen Gas Turbine Power Plant as Frequency Control Regulator and Dynamic Power Generator for Maintaining Grid Stability and Power Quality. Poster session presented at: National Power Engineering Research Scholars Meet - Indian Institute of Technology, Madras, Chennai, India.
- Partheepan, J., Rogers, W. J. (2016 Mar). Hydrogen/Oxygen Fuelled Flexible Green Power Plant. Paper presented at: 9th International Renewable Energy Storage Conference and Energy Storage Europe 2015, Düsseldorf, Germany.
- Partheepan, J., Rogers, W. J. (2016 Apr). Hydrogen Fuelled Green Flexible Power Plant. Paper and poster session presented at: The Energy Storage Association 26th Annual Conference and Expo, Charlotte, USA.
- Partheepan, J., Hunt, E.M. (2018 Mar). Hydrogen as Energy Storage Medium and Fuel for SIGT. Paper presented at: 21st annual EUEC 2018: Energy, Utility & Environment Conference & Expo, San Diego, USA.
- Le, S., Pham, T.A., Barrera, J., Partheepan, J., Hunt, E.M. (2018 Mar). Design and Implementation of Off Grid Residential Solar Power System. Poster session presented at: Spring 2018 Professional Development Seminar by IEEE, Amarillo, USA.

