

# Zheren Ma

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The University of Texas at Austin  
Dynamic Systems and Control, Mechanical Engineering

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## EDUCATION

**The University of Texas at Austin**  
Ph.D. student, Mechanical Engineering, GPA: 4.0/4.0  
Advisor: [Dongmei Chen](#)

2013-present

**Shanghai Jiao Tong University, China**  
B.S., Mechanical Engineering, GPA: 91.07/100

2009-2013

## SKILLS

- Programming Languages: Matlab/Simulink, C++, Python, Java, VB
- Commercial Softwares: Unigraphics, AutoCAD, Microsoft Power BI, DeltaV
- Other skills: System modeling and control, Computational fluid dynamics, Finite difference/volume analysis, Signal processing, Time series analysis and prediction

## PUBLICATIONS

### Journal Papers

- [Zheren Ma](#), Zeyu Yan, Mohamed L. Shaltout, Dongmei Chen  
[Optimal real-time control of wind turbine during partial load operation](#)  
*IEEE Transactions on Control Systems Technology*, vol. 23, no. 6, pp. 2216-2226, 2015.
- [Zheren Ma](#), Mohamed L. Shaltout, Dongmei Chen  
[An Adaptive Wind Turbine Controller Considering Both the System Performance and Fatigue Loading](#)  
*Journal of Dynamic Systems, Measurement, and Control*, vol. 137, no. 11, p. 111007, 2015.
- Liang Gong, Yan Xi, [Zheren Ma](#), Chengliang Liu  
[Modeling, identification and simulation of DC resistance spot welding process for aluminum alloy 5182](#)  
*Journal of Shanghai Jiaotong University*, vol. 18, no. 1, pp. 101-104, 2013.

### Conference Papers

- [Zheren Ma](#), Dongmei Chen  
[Modeling of coupled axial and torsional motion of a drilling system](#)  
*ASME Dynamic Systems and Control Conference*, pp. V002T20A005, 2015.
- [Zheren Ma](#), Dongmei Chen  
[Optimal power dispatch and control of a wind turbine and battery hybrid system](#)  
*American Control Conference*, pp. 3052-3057, 2015.
- [Zheren Ma](#), Mohamed L. Shaltout, Dongmei Chen  
[Adaptive gain modified optimal torque controller for wind turbine partial load operation](#)  
*ASME Dynamic Systems and Control Conference*, pp. V002T18A002, 2014.
- [Zheren Ma](#), Liang Gong, Yanming Li, Chengliang Liu  
[CMAC-based real-time calculation of the effective welding current during AC resistance spot welding](#)  
*IEEE International Conference on Mechatronics and Automation*, pp. 1669-1674, 2013.
- Chengzhang Li, [Zheren Ma](#), Lin Yao, Dingguo Zhang  
[Improvements on EMG-based handwriting recognition with DTW algorithm](#)  
*Engineering in Medicine and Biology Society (EMBC), 35th Annual International Conference of the IEEE*, pp. 2144-2147, 2013.
- [Zheren Ma](#), Brandon Li, Zeyu Yan  
Wearable driver drowsiness detection using electrooculography signal  
*IEEE Radio Wireless Week*, 2016.

## SELECTED PROJECTS

### **Multi-Phase Gas Kick Modeling and Automation** (9/2015-present)

- Proposed a novel multi-phase flow modeling methodology that can be deployed in combination with suitable hydraulic models for managed pressure drilling (MPD) well control.
- Developed a software package for gas kick simulation that can handle many complexities which occur during a MPD well control incident such as handling multiple kicks from one or several formations, dynamic well control, automated choke control, sudden pump start up/shut off, non-Newtonian drilling fluids, arbitrary wellbore path (including directional and horizontal wells), area discontinuity, etc.

### **Modeling and Simulation of Vibrations in a Drilling System** (2/2015-5/2015)

- Modeled drill string by using a distributed drill pipe model and a comprehensive rock-bit interaction model.
- Conducted vibration analysis including bit-bounce, stick-slip and bit whirl.

### **Control of a Wind Turbine and Battery Hybrid System** (6/2014-11/2014)

- Developed an efficient and reliable power scheduling approach that applied model predictive control (MPC) to probabilistic wind speed forecast.
- Proposed a real-time active power controller that enhances power reference tracking and optimizes the performances of hybrid system under instantaneously varying wind speed.

### **Wind Turbine Control During Partial Load Operation** (9/2013-5/2014)

- Designed a dynamic-programming-based controller and improved wind energy capture compared to the baseline control under fluctuating wind profiles.
- Proposed an adaptive gain modified optimal torque controller which improved turbine performances in terms of wind energy harvesting and fatigue loading mitigation, and better robustness against model uncertainties.
- Developed a wind turbine simulator for controller validation and fatigue analysis.

## INTERN EXPERIENCE

### **Emerson DeltaV Process Control Intern** Summer 2015

- Developed VBA code for automating data analysis and report generation.
- Conducted power spectrum analysis for identifying interacting control loops
- Created cloud-based dynamic reports using Microsoft Power BI.

### **Singapore Technologies Scholarship Intern** Summer 2012

- Developed an adaptive Pure Pursuit guidance law for automated guided vehicle (AGV).

## TEACHING/ RESEARCH EXPERIENCE

- Graduate Research Assistant in Petroleum Engineering 9/2015-present
- Graduate Research Assistant in Mechanical Engineering 1/2015-5/2015
- Teaching Assistant of Engineering Computational Methods 9/2013-12/2014

## COURSEWORK

- Linear System Analysis
- Advanced Vehicle Powertrain System
- Modeling and Simulation of Multi-energy System
- Introduction to Modern Control
- Time-series Modeling/Analysis/Control
- Optimal Control Theory
- Computational Fluid Mechanics
- Multi-variable Control System
- Digital Signal Processing
- Digital Control
- Stochastic Systems and Control