

# Zheren Ma

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Ph.D. Candidate in ME, UT Austin, zhrm@utexas.edu, 512-8658134

<b>OBJECTIVE</b>	Looking for a full-time position in algorithm/software development of control/data analytics	
<b>EDUCATION</b>	<b>The University of Texas at Austin</b>	<i>2013-present</i>
	Ph.D. Candidate in Mechanical Engineering, GPA: 4.0/4.0 Expected Graduation Date: <b>May 2017</b> , Advisor: <a href="#">Dongmei Chen</a>	
	<b>Shanghai Jiao Tong University, China</b>	<i>2009-2013</i>
	B.S. in Mechanical Engineering, GPA: 91.07/100	
<b>SKILLS</b>	<ul style="list-style-type: none"><li>• Programming Languages: Matlab, C#, WPF, C++, Python, VBA</li><li>• Commercial Softwares: Simulink, DeltaV, Microsoft Power BI, AutoCAD, NX Unigraphics</li><li>• Research skills: advanced control, system modeling, computational fluid dynamics, time series analysis and prediction, finite difference/volume analysis, signal processing</li></ul>	
<b>INTERN EXPERIENCE</b>	<b>Emerson DeltaV Process Control Intern</b>	<i>Summer 2015, Summer 2016</i>
	<ul style="list-style-type: none"><li>• Developed a C#/WPF Windows Application for automating control performance evaluation for a chemical plant.</li><li>• Automated data collection from open platform communication (OPC) server, DeltaV continuous historian, event chronicle SQL Server, DeltaV configuration etc.</li><li>• Automated data analysis including top 10 bad control loops identifications, interacting or fighting loops detection, valve diagnostics, operator interference analysis etc.</li></ul>	
	<b>Singapore Technologies Scholarship Intern</b>	<i>Summer 2012</i>
	<ul style="list-style-type: none"><li>• Implemented an adaptive guidance law using C++ for automated guided vehicle (AGV).</li></ul>	
<b>SELECTED RESEARCH PROJECTS</b>	<b>Multi-Phase Gas Kick Modeling and Automation</b>	<i>9/2015-present</i>
	<ul style="list-style-type: none"><li>• Proposed a novel multi-phase flow modeling methodology and hydraulic models for simulating different well control cases including managed pressure drilling (MPD), underbalanced drilling (UBD) and Wait &amp; Weight method.</li><li>• Developed a Matlab Application for gas kick simulation that can handle many complexities which occur during a 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.</li></ul>	
	<b>Modeling and Simulation of Vibrations in a Drilling System</b>	<i>2/2015-5/2015</i>
	<ul style="list-style-type: none"><li>• Modeled drill string vibration by using the wave propagation theory and a comprehensive rock-bit interaction model.</li><li>• Conducted vibration analysis including bit-bounce, stick-slip and bit whirl.</li></ul>	
	<b>Control of a Integrated Wind Turbine and Battery System</b>	<i>6/2014-11/2014</i>
	<ul style="list-style-type: none"><li>• Developed an efficient power scheduling approach that applied model predictive control (MPC) to probabilistic wind speed prediction obtained by time-series analysis</li><li>• Proposed a real-time active power controller that enhances power reference tracking and optimizes the performances of hybrid system under instantaneously varying wind speed.</li></ul>	
	<b>Wind Turbine Control During Partial Load Operation</b>	<i>9/2013-5/2014</i>
	<ul style="list-style-type: none"><li>• Proposed an adaptive generator torque controller that improved turbine performances in terms of wind energy harvesting, fatigue loading mitigation, and better robustness against model uncertainties.</li><li>• Developed a wind turbine simulator as a Matlab/Simulink Application for controller validation and fatigue analysis.</li></ul>	

## 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

## PUBLICATIONS

- Zheren Ma, Ali Karimi Vajargah, Pradeep Ashok, Dongmei Chen, Eric van Oort, Roland May, David Curry, John MacPherson, Gerald Becker, "Multi-phase well control analysis during managed pressure drilling operations", *SPE Annual Technical Conference and Exhibition*, 2016.
- Zheren Ma, Brandon Li, Zeyu Yan, Dongmei Chen, Wei Li, "Wearable sleepiness detection based on characterization of physiological dynamics", *ASME Dynamic Systems and Control Conference*, 2016.
- Mohamed L. Shaltout, Zheren Ma, Dongmei Chen, "An economic model predictive control approach using convex optimization for wind turbines", *American Control Conference*, pp. 3176-3181, 2016.
- Zheren Ma, Brandon Li, Zeyu Yan, "Wearable driver drowsiness detection using electrooculography signal", *IEEE Topical Conference on Wireless Sensors and Sensor Networks*, pp. 41-43, 2016.
- 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.
- 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 hand-writing recognition with DTW algorithm", *International Conference of Engineering in Medicine and Biology Society*, pp. 2144-2147, 2013.
- 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.

## GRADUATE COURSEWORK

- Time-series modeling/analysis/control
- Advanced vehicle powertrain system
- Convex optimization
- Stochastic systems and control
- Modeling of multi-energy system
- Computational fluid mechanics
- Digital signal processing
- Digital control
- Introduction to modern control
- Optimal control theory
- Multi-variable control system
- Linear system analysis