

Ge (Gaby) Ou, Ph.D.

Assistant Professor
Civil and Environmental Engineering Department, University of Utah
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RESEARCH INTERESTS:

Natural Hazard, Hazard Regional Impact, Structural Dynamics, Structural Control, Structural Testing, Earthquake Engineering, Wind Engineering, Infrastructure Resilience.

EDUCATION

Ph.D.	Purdue University, U.S. Lyles School of Civil Engineering	Aug. 2016
Dissertation: Robust Real Time Hybrid Simulation Techniques Incorporating Model Updating Advisor: Professor Shirley J. Dyke		
B.E.	The University of Sydney, Sydney, Australia Civil Engineering	Jul. 2010
B.S.	Harbin Institute of Technology, Harbin, China Theoretical and Applied Mechanics	Jun. 2010

PROFESSIONAL EXPERIENCE

Assistant Professor	University of Utah, U.S.	Aug. 2016 - Present
Research Assistant	Purdue University, U.S.	Aug. 2010 – Aug. 2016
Visiting Scholar	University of Western Sydney, Australia	May. 2010 – Aug. 2010
Visiting Scholar	University of Western Australia, Australia	Nov. 2008 – Feb. 2009

TEACHING

STATICS

Fall 2020

CVEEN 2010, section 001, University of Utah

- New course adapted for the Civil Engineering Department

- Directed to sophomore undergraduate students

STRUCTURAL DYNAMICS AND EARTHQUAKE ENGINEERING

Fall 2019

CVEEN 6250, section 001, University of Utah

- New course revitalized for the Civil and Environmental Engineering Department
- Combines concepts of both theory and experimental dynamics
- Directed to graduate students

COMPUTER-AIDED STRUCTURAL ANALYSIS

Fall 2017, Fall 2019

CVEEN 6270, section 001, University of Utah

- New course revitalized for the Civil and Environmental Engineering Department
- Concept of Matrix Structural Analysis, MATLAB coding and OpenSees
- Directed to graduate students

COMPUTER-AIDED DESIGN

Spring 2017-2020

CVEEN 1400, section 001, University of Utah

- New course developed for the Civil and Environmental Engineering Department
- Concept of AutoCAD Civil 3D based site development and construction
- Directed to freshman students
- First time this course is offered

UoU STUDENT MENTORING

PHD STUDENTS

Mohammadreza Sheibani Fall 2017-present
 “Post-Seismic Regional Structural Damage Inference using Gaussian Process Regression” (expected graduation May 2021)

Objective Resilience Student Award (1st place in 2020 EMI student competition) 2020.07

Jiayue Xue Fall 2017-present
 “Numerical and Data Based Approach to Estimate Power Infrastructure Failure during a Hurricane and its Impact to Power Transmission System” (expected graduation May 2021)

Zhongming Xiang Fall 2017-present
 “Ground Penetrating Radar based BIM Development with Reinforcement Bar Identification for in Service Buildings” (expected graduation May 2021)

“Open Access Data Generation Engine for Bulk Power System under Extreme Windstorms” (expected graduation May 2024)

PROJECT AND CONTRACT

1. Automated Preventive Power System Operation During Hurricanes; Sahraei-Ardakani, Mostafa (PI); **Ou, Ge**; Pu, Zhaoxia; *Utah Science Technology and Research*, 07/01/2018 - 12/31/2019. Total project budget: \$196,320.00. Personal Share: \$198,324.00.
2. EAGER: Real-Time: Effective Power System Operation during Hurricanes using Historical and Real-Time Data; *National Science Foundation*; Sahraei-Ardakani, Mostafa (PI); **Ou, Ge**; Pu, Zhaoxia; 10/01/2018 - 09/30/2021. Total project budget: \$298,864.00.
3. Elements: Open Access Data Generation Engine for Bulk Power System under Extreme Windstorms; *National Science Foundation*; **Ou, Ge (PI)**; Sahraei-Ardakani, Mostafa; Pu, Zhaoxia; 07/01/2020 - 06/30/2023. \$498,032.00.
4. EAGER: SAI: Socio-Technological Guided Enhancement of Power Infrastructure Resilience; *National Science Foundation*; Schelly, Chelsea (PI); **Ou, Ge (UofU PI)**; Sahraei-Ardakani, Mostafa; Chen, Jianli; 07/01/2021 - 06/30/2023. \$299,123.00. (Encouraged Full Proposal Submission, Pending)
5. Collaborative Research: Resource-Constrained Optimal Learning Framework Development and Post-Seismic Regional Building Damage Inference; *National Science Foundation*; **Ou, Ge (PI)**; Markovic, Nikola; 07/01/2021 - 06/30/2024. \$329,188.00. (Pending)

PROFESSIONAL SERVICE AND EXPERIENCE

EXTERNAL SCHOLAR SERVICE

- Guest Editor for *Journal of Low Frequency Noise*, Special Issue, ***Towards smart buildings and structures: condition monitoring, assessment and control***, 2017-2018.
- Reviewer for *Smart Structures and Systems*;
- Reviewer for *Journal of Performance of Constructed Facilities*;
- Reviewer for *Journal of Structural Integrity and Maintenance*;
- Reviewer for *Journal of Low Frequency Noise, Vibration & Active Control*;
- Reviewer for *Journal of Earthquake Engineering*;
- Reviewer for *Journal of Structural Control and Monitoring*;

- *Reviewer for Journal of Earthquake Engineering and Structural Dynamics*
- *Review for Journal of Engineering Mechanics;*
- *Review for Journal of Bridge Engineering;*
- *Reviewer for Journal of Structural Health and Monitoring;*
- *Reviewer for Frontiers in Built Environment;*
- *Reviewer for Applied Sciences;*
- ASCE - Structural Health Monitoring and Control (SHMC) committee, 2017-2019.
- MECHS (**Multihazard Engr Hybrid Simulation**) member and committee, 2017-2020.
- Developed **MECHS** Webinar, Anatomy of a Hybrid Simulation/Real-time Hybrid Simulation, June 8, 2018
- Invited attendee at “1st MECHS Workshop”, *National Science Foundation*, University of California at San Diego, December 15-16, 2017.
- Participants and Travel grant awardee at NEHRI Summer Institute, *National Science Foundation*, San Antonio, TX, July 25-28, 2017.

INTERNAL SERVICE

- Co-director of WeatherG Initiative (<http://weatherg.utah.edu/>), University of Utah, 2018-2020.
- College of Engineering Scholarship Committee, University of Utah, 2017-2019.
- Faculty Senate Advisory Committee on Student Course Feedback, University of Utah, 2019
- Scholarship Committee chair, Department of Civil and Environmental Engineering, 2017-2020.

OTHER SERVICES AND CERTIFICATE PRIOR TO UoU:

- Invited participant at the Real-Time Hybrid Simulation International Workshop at the European Laboratory for Structural Assessment, October 5-6, 2015, Ispra, Italy.
- Invited participant at the Hybrid Simulation Task Force meeting I, January 27-28, 2014, West Lafayette, Indiana.
- Invited participant at Hybrid Simulation Task Force meeting II, March 27-28, 2014, West Lafayette, Indiana.
- Support and participation in the 5th US-China Workshop, July 25, 2014, Anchorage, AK,

- Logistical support and organization for Special Issue on Real-time Hybrid Simulation in *Smart Structures and Systems*, Techno Press, published December 2014 and January 2015, with Guest Editors: Shirley J. Dyke, Narutoshi Nakata and Bin Wu, 2014.
- Logistical support for and participation in Hybrid Simulation User Requirements Workshop, August 8, 2013, Reno, NV.
- Logistical support for and participation in 4th US-China Workshop, August 10-11, 2013, Reno, NV.
- Participated in the 3rd US-China Workshop, August 13-14, 2012, Berkeley, CA.

REFEREED JOURNAL PUBLICATIONS

Underline indicates advised student, * indicates corresponding author;

1. Guirong Yan*, Alessandro De Stefano and **Ge Ou**, “A General Nonlinear System Identification Method Based upon the Time-varying Trend of the Instantaneous Vibration Frequency and Amplitude”, *Advances in Structural Engineering*, **15(5)**, 2012: 781-792. (IF 1.500)
2. **G. Ou***, Y. Wang, H. Hao and X.Q. Zhu, “Identification of De-bonding between Steel Bars and Concrete using Wavelet Techniques: Comparative Study”, *Australian Journal of Structural Engineering*, **14(1)**, 2013: 43-56.
3. Y. Qian*, **G. Ou**, A. Maghareh, and S.J. Dyke, “Parametric Identification of a Servo-Hydraulic Actuator for Real-Time Hybrid Simulation”, *Mechanical Systems and Signal Processing*, **48(1)**, 2014: 260-273. (IF 6.471)
4. **G. Ou***, AI. Ozdagli, S.J. Dyke, and B. Wu, “Robust Integrated Actuator Control: Experimental Verification and Real Time Hybrid Simulation Implementation”, *Earthquake Engineering and Structural Dynamics*, **44(3)**, 2015: 441-460.
5. **G. Ou***, S.J. Dyke, and A. Prakash, “Modified Runge-Kutta Integration Algorithm for improved stability and accuracy in Real Time Hybrid Simulation”, *Journal of Earthquake Engineering*, *Published online: 29 Jun 2015*.
6. **G. Ou***, S.J. Dyke, and A. Prakash, “Real time hybrid simulation with online model updating: An analysis of accuracy”, *Mechanical Systems and Signal Processing*, **84(B)**, 2017: 223-240. (IF 6.471)
7. M.L. Brodersen*, **G. Ou**, J. Høgsberg, and S.J. Dyke, “Analysis of hybrid viscous damper by real time hybrid simulations”, *Journal of Engineering Structures*. 126 (2016): 675-688. (IF: 3.775)

8. Z. Sun*, **G. Ou**, S.J. Dyke and C. Lu, “A state estimation method for wireless structural control systems”, *Journal of Structural Control and Health Monitoring*. 2017 Jun 1: 24(6). (IF 3.499)

After Joining U-of-U

9. Yang G*, Wu B, **Ou G**, Wang Z, Dyke S. “HyTest: Platform for Structural Hybrid Simulations with Finite Element Model Updating”. *Advances in Engineering Software*. 112 (2017): 200-210. (5 year IF: 5.513)
10. An, Y.*, Wang, Z., **Ou, G.**, Pan, S., & Ou, J. (2019). Vibration Mitigation of Suspension Bridge Suspender Cables Using a Ring-Shaped Tuned Liquid Damper. *Journal of Bridge Engineering*, 24(4), 04019020. (IF 1.84)
11. Z. Xiang, A. Rashidi, and **G. Ou**, “States of Practice and Research on Applying GPR Technology for Labeling and Scanning Constructed Facilities” *Journal of Performance of Constructed Facilities*, 33 (5), 03119001 (IF 1.542)
12. A. I. Ozdagli*, W. Xi, **G. Ou**, L. Bo, S. J. Dyke, D. Yong, G. Xu, T. Wang, B. Wu, J. Zhang, “Experimental Verification of a Geographically-Distributed Real-time Hybrid Simulation Platform”, *Structural Control and Health Monitoring* 27 (2), e2483 (IF 3.499)
13. Sang, Y., Xue, J., Sahraei-Ardakani, M.*, and **Ou, G.**, “Reducing Hurricane-induced Power Outages through Preventive Operation”. in *IEEE Systems Journal*, 2019. (IF 2.063)
14. Z. Xiang*, **G. Ou**, and A. Rashidi “An automated process to simultaneously determine 3D location and size of rebar in GPR data”, *Journal of Performance of Constructed Facilities*, Published, 2020 (IF 1.542)
15. **G. Ou***, G. Yang, B. Wu and S. Dyke, “Investigation of Hybrid Simulation with Model Updating with Comparing to Shake Table Test”*, *Frontiers in Built Environment*, Published, 2020.
16. Xue, J., Mohammadi, F., Li, X., Sahraei-Ardakani, M., **Ou, G.***, and Pu, Z., “Impact of Transmission Tower-Line Interaction to the Bulk Power System during a Hurricane”, *Reliability Engineering & System Safety* (2020): 107079. (IF 5.156)
17. M. R. Sheibani, and **G. Ou***, “The Development of Gaussian Process Regression for Rapid Regional Post-Earthquake Building Damage Assessment”, *Computer-aided Civil and Infrastructure Engineering*, Published, 2020. (IF 8.552)

* Promoted in the Natural Hazards Engineering newsletter. <https://www.designsafe-ci.org/community/news>

18. Mohammadi, F., Jafarishiadeh*, F., J. Xue, Sahraei-Ardakani, M., **G. Ou**, *Deterministic Proxies for Stochastic Unit Commitment During Hurricanes, IET Generation Transmission & Distribution, Accepted, 2020. (IF 4.100)*
19. J. Xue, **G. Ou***, and Z. Xiang, “Predicting Transmission Tower Time History Response during Complex Wind Input through a CNN based Surrogate Model”, *Journal of Engineering Structures, Published, 2021. (IF 3.775)*
20. Z. Xiang*, **G. Ou**, and A. Rashidi “Development of Robust Cascaded Frequency Filters to Recognize Rebar in GPR Data with Complex Signal Interference”, *Automation in Construction, Published, 2021. (IF: 5.81)*

Under Review

21. M. R. Sheibani, Y. Wang, N. Markovic, and **G. Ou***, “Efficient Structural Reconnaissance Surveying for Regional Post-Seismic Damage Inference with Optimal Inspection Scheduling”, *under review, invited contribution as the Awardee of EMI Best Student Papers, Journal of Engineering Mechanics, 2020. (IF. 2.26)*
22. M. R. Sheibani and **G. Ou***, “Active Learning of the Post-Earthquake Damage with an Adaptable Local Kernels Algorithm Based on Mutual Information”, *Reliability Engineering & System Safety, under review, 2020. (IF 5.156)*
23. J. Xue, and **G. Ou***, “Nonlinear Wind-induced Structural Response Prediction with Deep LSTM Model and its Application”, *Smart Structure and Systems, under review, 2020 (IF 3.820)*
24. Z. Xiang*, A. Rashidi, and G. Ou, “GPR2BIM: An Automatic Procedure to Translate Rebar Spatial Information from GPR Data into BIM”, *ASCE Journal of Construction and Management, under 2nd round review, 2020 (IF 3.38)*
25. M. R. Sheibani and **G. Ou***, “Post-earthquake Regional Damage Assessment using Label Fusion”, *Invited contribution, Special Issue - Artificial Intelligence-powered Methodologies and Applications in Earthquake and Structural Engineering, Frontiers in Built Environment, Under Review, 2021.*
26. J. Xue, X. Li, Z. Pu, and **G. Ou***, “Power Facility Damage Prediction during Hurricane Harvey Utilizing LSTM-based Surrogate Model”, *Engineering Structures, Under Review 2021. (IF 3.775)*

In Progress

27. **Ou, G.***, Xue, J., Mohammadi, F., Li, X., Sahraei-Ardakani, M., and Pu, Z., “Synthetic Power System Performance under Hurricane Harvey: A Benchmark Problem of Hurricane Induced Power

Outage Simulator,” *Invited contribution, Special Issue - Machine Learning Methods and Big Data Analytics in Structural Health Monitoring, Frontiers in Built Environment, to be submitted 2021, Abstract accepted.*

28. M. R. Sheibani and **G. Ou***, “Efficient pool-based active learning for GPR with kernel k-means and dual mutual information”, *In preparation, 2021.*
29. M. R. Sheibani and **G. Ou***, “Active Inference of Post-Earthquake Building Damage Assessment and its evaluation in the Northridge Earthquake”, *In preparation, 2021.*

Technical Reports (underline indicates PhD student)

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1. Jiayue Xue and **Ge Ou**; “Benchmark Transmission Tower Designs in Developing a Power Outage Simulator during Hurricanes,” RHIMAL Report Series 001, 2019, University of Utah;
 2. Jiayue Xue and **Ge Ou**; “Fragility Analysis of Transmission Tower,” RHIMAL Report Series 002, 2020, University of Utah;
 3. Ali Irmak Ozdagli; Wang Xi; **Ge Ou**; Shirley Dyke; Jian Zhang; Bin Wu, “Verification of Real-Time Hybrid Simulation With Shake Table Tests for a Three Story Structure Equipped with MR Damper,” IISL Report Series 007, 2014, Purdue University, <https://nees.org/resources/12822>
 4. Naru Nakata; Shirley Dyke; Jian Zhang; Gilberto Mosqueda; Xiaoyun Shao; Hussam Mahmoud; Monique Hite Head; Michael Bletzinger; Gemez A. Marshall; **Ge (Gaby) Ou**; Cheng Song, "Hybrid Simulation Primer and Dictionary," 2014, <https://nees.org/resources/7702>
 5. Richard Christenson; Shirley Dyke; Jian Zhang; Gilberto Mosqueda; Cheng Chen; Naru Nakata; Patrick Laplace; Wei Song; Yunbyeong Chae; Gemez Marshall; **Ge (Gaby) Ou**; Cheng Song; Carlos Andres Riascos, "Hybrid Simulation: A Discussion of Current Assessment Measures," 2014, <https://nees.org/resources/12876>

Publications in Conference Proceedings and Presentations

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1. **G. Ou**, etc. “Research and development of POF based smart transparent concrete.” *6th International Conference on Vibration Engineering, ICVE 2008*, June, Dalian.
 2. Z. Zhou, **G. Ou**, Y. Hang, G. Chen and J. Ou., "Research and development of plastic optical fiber based smart transparent concrete", *Proceeding of SPIE 7293, Smart Sensor Phenomena, Technology, Networks, and Systems*, 9-11 March 2009, San Diego, California

3. **G. Ou**, F. Lin, X. Gao and S. J. Dyke., “Application of an H-infinity Feedback Controller to Accommodate Actuator Dynamics for Real-time Hybrid Testing”, *CSCE 2012*, June 6-9, Edmonton, Canada.
4. **G. Ou**, X. Gao and S. J. Dyke. “Case Studies: Experimental Validation of Real Time Hybrid Simulation Using Magneto-Rheological Dampers ”, *EMI 2012*, June 17-20 2012, Notre Dame, IN, USA.
5. A. Maghareh, **G. Ou**, Y. Qian and S. J. Dyke., “Investigation of Uncertainties Associated with Actuation Modeling Error and Sensor Noise on Real Time Hybrid Simulation Performance”, *ICNC'13 - Workshops-CPS*, January 28-31, 2013 San Diego, CA, USA.
6. **G. Ou**, S. J. Dyke, B. Wu, A.I. Ozdagli, and B. Li, “Robust integrated actuator control strategy for real time hybrid simulation”, *SERIES Workshop*, May 28-30, 2013, Ispra, Italy.
7. **G. Ou**, A.I. Ozdagli, S. J. Dyke, and B. Wu, “Application of Robust Integrated Actuator Control Strategy in Real-Time Hybrid Simulation”, *QuakeSummit 2013*, Reno, Aug 07-10.
8. **G. Ou**, S.J. Dyke, and A. Prakash, “A modified Runge-Kutta integration method for computational delay in real time hybrid simulation”, *Proceedings of the 10th NCEE*, EERI, Anchorage, AK, 2014.
9. **G. Ou**, A.I. Ozdagli, S.J. Dyke, A.Prakash “RTHS with Concurrent Model Updating on a Distributed Platform”, *Proceedings of the 6AESE/11ANCRiSST Conference*, Urbana-Champaign, IL, 2015.
10. **G. Ou**, S.J. Dyke, “Real Time Hybrid Simulation with Online Model Updating on Highly Nonlinear Device”, *Proceedings of the IMAC-XXXIV Conference & Exposition on Structural Dynamics*, Orlando, Florida, Jan. 25-26, 2016.
11. Sahraei-Ardakani, M., and **G. Ou**. "Day-ahead preventive scheduling of power systems during natural hazards via stochastic optimization." Power & Energy Society General Meeting, 2017 IEEE. IEEE, 2017.
12. Y. Sang, M. Sahraei-Ardakani, J. Xue, and **G. Ou**, “Effective Scenario Selection for Preventive Stochastic Unit Commitment during Hurricanes”, *2018 IEEE International Conference on Probabilistic Methods Applied to Power Systems (PMAPS)*
13. J. Xue, Y. Sang, **G. Ou**, and M. Sahraei-Ardakani, Guided Preventive Power System Operation During Hurricanes with Structural Vulnerability Analysis, *2018 conference of Engineering Mechanics Institute (EMI 2018)*

14. **G. Ou** and S.J. Dyke, Comparison of Hybrid Simulation with Model Updating to a Shake Table Test, *2018 conference of Engineering Mechanics Institute (EMI 2018)*
15. M. Sheibani, **G. Ou**, and S. Zhe, “Rapid Seismic Risk Assessment of Structures Using Gaussian Process Regression Learning” *IMAC XXXVII, Society for Experimental Mechanics*, 2018
16. M. Sahraei-Ardakani and **G. Ou** “Preventive Power System Operation During Hurricanes,” FERC Software Conference, Federal Energy Regulatory Commission, Jun. 2018, Washington, DC, USA.
17. M. Sahraei-Ardakani, F. Mohammadi, **G. Ou**, Z. Pu, J. Xue, X. Lin, and Y. Sang, “Reliability Enhancement via Integration of Extreme Weather Forecast in Power System Operation,” 9th International Conference on Power and Energy Systems 9 (ICPES 2019), December 2019, Perth, Australia.
18. Y. Sang, J. Xue, M. Sahraei-Ardakani, and **G. Ou**, “Comparing a New Power System Preventive Operation Method with a Conventional Industry Practice during Hurricanes,” 2019 North American Power Symposium (NAPS), Wichita, KS, USA.
19. Z. Xiang, A. Rashidi, and **G. Ou**, “Rebar Recognition in GPR Pattern Using Improved Convolutional Neural Network” *2019 Conference in Computing in Civil Engineering, full paper submitted, 2019*
20. J. Xue, Y. Sang, **G. Ou**, and M. Sahraei-Ardakani, Structural Sensitivity Analysis of Transmission Tower’s Finite Element Model for Power Outage Prediction, *2019 conference of Engineering Mechanics Institute (EMI 2019)*
21. M. Sheibani and **G. Ou** “Rapid Damage Assessment of Structures Using Machine Learning – A sensitivity Analysis”, *2019 conference of Engineering Mechanics Institute*
22. M. Sahraei-Ardakani, F. Mohammadi, **G. Ou**, and Z. Pu, “Scalable Preventive Unit Commitment for Operation during Extreme Weather,” FERC Software Conference, Federal Energy Regulatory Commission, Jun. 2019, Washington, DC, USA.
23. M. Sheibani and **G. Ou**, “Effective Learning of Post-seismic Building Damage with Sparse Observations” *IMAC XXXVIII, Society for Experimental Mechanics, 2020*

Invited Seminars:

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- *Robust Real Time Hybrid Simulation Techniques: From Actuator Control to Numerical Integration, Purdue University, Invited to present in the Civil Engineering Structural Seminar, Nov. 12, 2013.*

- *Robust Real Time Hybrid Simulation Techniques: From Actuator Control to Numerical Integration*, University of Illinois at Urbana-Champaign, Nov. 15, 2013.
- *Robust Real Time Hybrid Simulation Techniques: From Actuator Control to Numerical Integration*, Harbin Institute of Technology, Dec. 31, 2013.

Education and Outreach Products:

- **Ge (Gaby) Ou** and Shirley Dyke (2013), “A Real Time Hybrid Simulation Demo Code,” includes a complete instruction guide and sample code to explain the concept and fundamentals of RTHS to new researchers and students, <https://nees.org/resources/6984>.
- Gemez Marshall, **Ge (Gaby) Ou**, Cheng Song, Kari Nasi, Dawn Weisman, Rajesh Thyagarajan (2012), “Project Editor Quick Start Guide,” to guide hub/cyberinfrastructure users that have little experience with existing data upload tools, <https://nees.org/resources/4617>.
- Carlos Andres Riascos, **Ge (Gaby) Ou**, and Shirley Dyke (2014), “Toolkit for Hybrid Simulations (Current Assessment Measures),” a Matlab-based toolkit for community use to compute assessment measures for general hybrid simulation experiments (complements associated technical report), <https://nees.org/resources/hscam>.
- **Ge (Gaby) Ou**, MECHS Webinar | Anatomy of a Hybrid Simulation/Real-time Hybrid Simulation, June 8, 2018, <https://www.youtube.com/watch?v=uIhqwlndjPg>