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# Alana Lund

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## Education

Doctor of Philosophy in Civil Engineering (Purdue University, West Lafayette, IN) GPA: *3.98/4.0* *est. Dec. 2020*

- National Science Foundation Graduate Research Fellow
- Purdue Doctoral Fellow

Master of Science in Civil Engineering (Purdue University, West Lafayette, IN) GPA: *4.0/4.0* *Dec. 2016*

- National Science Foundation Graduate Research Fellow

Bachelor of Science in Civil Engineering (Purdue University, West Lafayette, IN) GPA: *3.97/4.0* *May 2015*

- Minors in Computer Science and Mathematics
- University and Engineering Honors
- Graduated with Highest Distinction

## Research Experience

Graduate Research Assistant *Fall 2015-Present*

Intelligent Infrastructure Systems Laboratory (IISL), Purdue University, West Lafayette, IN

Predictive Science Lab, Purdue University, West Lafayette, IN

- Dissertation Project: Bayesian Identification of Nonlinear Structural Systems
  - Automatically identifies dynamic models of large-scale structures to predict future performance
  - Presents findings at national and international conferences to collaborate on the state-of-the-art
  - Educates new graduate students in structural health monitoring strategies.
- Joint Transportation Research Program Project #4222: Seismic Evaluation of Indiana Bridge Network
  - Co-authored project proposal resulting in a research grant of $375,000 from the Indiana DOT.
  - Works under the direction of Dr. Shirley Dyke and Dr. Julio Ramirez to lead a team of Masters students in developing an automated assessment tool for Indiana bridges
- IISL Management: Lab Manager
  - Trains new graduate students on lab use and good practice in structural dynamics testing.
  - Maintains, calibrates, and updates laboratory equipment

Co-secretariat (on behalf of Shirley Dyke, Andres Arrieta and Mohammad Jahanshahi) *12 July – 1 August 2020*

International Workshop on Advanced Smart Materials and Smart Structures Technology and

Asia-Pacific-Euro Summer School on Smart Structures Technology, Purdue University, West Lafayette, IN

- Manages budget and sponsorships to create opportunities for student and industry participation at both events.
- Collaborates with organizing committee members to plan course material, workshops, and student activities

Student *23 June - 13 July 2016*

Asia-Pacific-Euro Summer School on Smart Structures Technology, Cambridge, UK

- Led a team of students in the design, implementation, and data processing of a monitoring system for a small scale truss. The team was recognized as the top group in the monitoring competition

Field Researcher *6-18 March 2016*

Meinong Earthquake Reconnaissance Trip, Tainan City, Taiwan

- Gathered building damage data for 113 structures in the region affected by the earthquake
- Collaborated with researchers from NCREE to enhance research practices and data sharing

Undergraduate Researcher Fellow *Summer 2013*

Summer Undergraduate Research Fellowship (SURF), Purdue University, West Lafayette, IN

- Verified the efficacy of prototype MR Dampers in the reduction of small-scale structural vibration

- Assisted with testing of novel wireless sensing systems for use in structural control
- Communicated with research group to gain greater understanding of the purpose and process of research
- Received Top Presentation Award during the SURF Symposium

## Teaching Experience

Co-Instructor: CE 573 - Structural Dynamics *Fall 2019*

Purdue University, West Lafayette, IN

- Delivered lectures on key topics in structural dynamics
- Developed a course project under the direction of the main professor, Dr. Shirley Dyke

Student Instructor: GK-12 Program *Spring 2017*

Purdue University and Tecumseh Junior High, Lafayette, IN

- Co-taught 8th grade math students at Tecumseh Junior High School once a week throughout the semester.
- Developed original lesson series to teach earthquake disaster management concepts from an engineering and mathematics perspective.

## Work Experience

Structural Engineering Intern *Summer 2015*

Thornton Tomasetti, Chicago, IL

- Developed updates for some of Thornton Tomasetti's standard engineering details
- Assisted in the design effort for a medical research center in downtown Chicago

## Volunteer Experience

Teacher: Youth Sunday School *Summer 2017-Present*

Church of Jesus Christ of Latter-Day Saints, West Lafayette, IN

- Co-teaches the 14 yr. old Sunday School class once a week.
- Adapts lesson plans from a generalized manual to meet the specific needs of the students in the class.

Website Designer and Team Member: Engineering Projects in Community Service (EPICS) *Spring 2012*

Purdue University, West Lafayette, IN

- Redesigned covered-blade tube cutting device to improve the safety of handicapped employees at Wabash Center Greenbush Industries.
- Facilitated progression of project through effective communication of design questions and drive for answers.

## Awards and Honors

- 1st Place Presentation in 4th Midwest Smart Structures Technology Colloquium *April 2019*
- PEO Scholar Award *Fall 2018-2019*
- National Science Foundation Graduate Research Fellowship *Fall 2015-Present*
- Purdue Doctoral Fellowship *Fall 2015-Present*
- 2nd Place Presentation in 3rd Midwest Smart Structures Technology Colloquium *October 2017*
- Structural Health Monitoring Competition Winner of APESS Summer School *July 2016*
- Purdue University Trustees Scholarship *August 2011-May 2015*
- Induction to Tau Beta Pi *November 2013*
- Top Presentation Award at the Summer Undergraduate Research Fellowship Program Symposium *August 2013*
- Black Belt in Universal Kempo Karate *November 2007*

## Grants and Proposals

- Co-authored a proposal on behalf of the Joint Transportation Research Program (JTRP) entitled "Seismic Evaluation of Indiana Bridge Network and Current Bridge Database for Asset Management", SPR 4222. ($375,000) *Nov. 2017*

## Publications

**Lund, A.**, A. Puranam, R. Whelchel, & S. Pujol (Submitted). Serviceability in Elements with High-Strength Steel Reinforcement. *Concrete International*

**Lund, A.**¸ S.J. Dyke, W. Song, & I. Bilionis (In Press). Identification of an Experimental Nonlinear Energy Sink Device Using the Unscented Kalman Filter. *Mechanical Systems and Signal Processing*.

**Lund, A.**, S.J. Dyke, W. Song, & I. Bilionis (2019, Aug.). Global Sensitivity Analysis for the Design of Nonlinear Identification Experiments. *Nonlinear Dynamics*. 98.1, pp. 375-394. https://doi.org/10.1007/s11071-019-05199-9

**Lund A.**, S.J. Dyke, W. Song, I. Bilionis (2019, Jan.) Bayesian Identification of a Nonlinear Energy Sink Device: Method Comparison. *Proceedings of the 37th International Modal Analysis Conference*, Orlando, Florida. Published in*Model Validation and Uncertainty Quantification, Volume 3* pp. 173-175. Springer.

Yeum, C.M., **A. Lund**, S.J. Dyke, & J.A. Ramirez (2019, Jan.). Automated Recovery of Structural Drawing Images Collected From Post-Disaster Reconnaissance. *Journal of Computing in Civil Engineering.* 33:1, pp. 1-11. https://doi.org/10.1061/(ASCE)CP.1943-5487.0000798

Yeum, C.M., S.J. Dyke, B. Benes, T. Hacker, J.A. Ramirez, **A. Lund**, & S. Pujol (2019, Jan.). Postevent Reconnaissance Image Documentation using Automated Classification. *Journal of Performance of Constructed Facilities*. 33:1, pp. 1-11. https://doi.org/10.1061/(ASCE)CF.1943-5509.0001253

**Lund, A.**, C. Roemmele, L. Roetker, & S. Smith (2018, March). Shaking it Up. *The Science Teacher*. 85:3. pp. 36-42.

Yeum, C.M., S.J. Dyke, B. Benes, T. Hacker, J.A. Ramirez, **A. Lund**, & S. Pujol. (2017, September) Rapid, Automated Image Classification for Documentation. *Proceedings of the 7th Conference on Advances in Experimental Structural Engineering*, Pavia, Italy.

**Wilbee, A**, F. Pena, S.J. Dyke, I. Bilionis, & P. Pandita (2016, June). Quantifying Recovery for Structures Incorporating Control. *Proceedings of the Int. Conf. on Smart Infrastructure and Construction*, Cambridge, UK.

**Wilbee, A**, F. Pena, J. Condori, Z. Sun, & S.J. Dyke (2015, August). Fragility Analysis of Structures Incorporating Control Systems. *Proceedings of the 6th Intl. Conf. on Adv. In Exp. Structural Eng., 11th Intl. Wkshp. On Adv. Smart Materials and Smart Structures Tech.*, Urbana-Champaign, IL. 138.

Sun, Z., S. J. Dyke, F. Pena, & **A**. **Wilbee** (2015, March). Development of Arduino based wireless control system. *SPIE Smart Structures and Materials + Nondestructive Evaluation and Health Monitoring*. pp. 94351D, 1-11. https://doi.org/10.1117/12.2083707

## Presentations and Seminars

**Lund A.**, S.J. Dyke, W. Song, I. Bilionis (2019, Apr.) Bayesian Identification of a Nonlinear Energy Sink Device. *Presented at the 4th Midwest Smart Structures Technology Colloquium, West Lafayette, IN*.

**Lund A.**, S.J. Dyke, W. Song, I. Bilionis (2019, Jan.) Bayesian Identification of a Nonlinear Energy Sink Device: Method Comparison. *Presented at the 37th International Modal Analysis Conference, Orlando, FL*.

**Lund, A.**, S.J. Dyke, W. Song, I, Bilionis (2018, May). Kalman Filters and the Real World: Use of the Unscented Kalman Filter under Practical Uncertainties. *Presented at the Engineering Mechanics Institute Conference, Boston, MA.*

**Lund, A.**, S.J. Dyke (2017, October). Searching for Safety: An Exploration of Nonlinear Kalman Filter Methods. *Presented at the 3rd Midwest Smart Structures Technology Colloquium, Champaign-Urbana, IL.*

**Lund, A.**, S.J. Dyke, G. Ou, & B. Xu (2017, June). Experimental Verification of LSE Structural Identification Method with Limited Data Availability. *Presented at the Engineering Mechanics Institute Conference, San Diego, CA.*

**Wilbee, A.**, S.J. Dyke, G. Ou, B. Xu (2016, October). Examination and Adaptation of the Data-Based Model-Free Restoring Force and Mass Identification Method. *Presented at the 2nd Midwest Smart Structures Technology Colloquium, West Lafayette, IN.*

Colby, K., **A. Wilbee,** S. Seok, (2016, September). Research Computing for Civil Engineers. *Seminar for the College of Civil Engineering Graduate Program, Purdue University, IN.*

**Wilbee, A.**, F. Pena, S.J. Dyke, I. Bilionis, & P. Pandita (2016, June). Quantifying Recovery for Structures Incorporating Control. *Poster presented at the International Conference on Smart Infrastructure and Construction, Cambridge, UK.*

**Wilbee, A.** & S.J. Dyke (2015, October). Fragility Analysis of Structures with Control Devices. *Presentation at the 1st Midwest Smart Structures Technology Colloquium, Grafton, IL.*

**Wilbee, A.**, F. Pena, J. Condori, Z. Sun, & S.J. Dyke (2015, August). Fragility Analysis of Structures Incorporating Control Systems. *Presented at the 6th Intl. Conf. on Adv. In Exp. Structural Eng., 11th Intl. Wkshp. On Adv. Smart Materials and Smart Structures Tech., Urbana-Champaign, IL.*

**Wilbee, A.** (2013, August). Earthquake Damage Prevention: Semi-Active Structural Control of a Two-Story Shear Building. *Presented at the Symposium for the Summer Undergraduate Research Fellowship at Purdue University, West Lafayette, IN.*

## Data Sets

**Lund, A.**, C. Silva, S.J. Dyke, W. Song, & I. Bilionis (2019, July). "Response of a Prototype Nonlinear Energy Sink Device to Various Base Excitations", in Bayesian Identification of a Prototype Nonlinear Energy Sink Device. DesignSafe-CI. https://doi.org/10.17603/ds2-nh34-e513.

**Lund, A.** A.Y. Puranam, R.T. Whelchel, L. Laughery, H. Skovgaard, S. Pujol (2017), "Service Load Deflections in Slabs with High Strength Steel Reinforcement," https://datacenterhub.org/resources/14698.

## Co-Curricular Activities

- Bowen Laboratory Student Advisory Council (BSAC) *July 2017-Present*
  - President (2018-19): Raised organization funding level from $500/yr to $2,000/yr. and tripled participation in BSAC events.
  - Secretary (2017-18): Kept Bowen researchers informed about lab activities.
- Purdue Earthquake Engineering Research Institute (EERI) *Feb. 2016-2018*
  - Social Event Coordinator (2017-18): Organized social activities for club members.
- Purdue Night Train Swing Dance Club *August 2012-2015*
  - Instructor (2014-15): Co-taught beginner level swing-dancing to a class of 20.
- Purdue Society of Women Engineers *August 2011-2013*
  - Girl Scout Day Chair (2012-13): Organized an ‘Engineering Day’ for local girl scout troops (100+ participants), including multiple talks and activities