

**Morgan Broberg**  
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## EDUCATION

- Ph.D. in Civil Engineering** December 2022  
Lyles School of Civil Engineering, Purdue University, West Lafayette, IN  
Title: Seismic Design of Coupled Composite Plate Shear Walls – Concrete Filled  
Advisor: Amit Varma
- Certificate in Teaching and Learning in Engineering** December 2021  
School of Engineering Education, Purdue University, West Lafayette, IN
- B.S. in Engineering, Civil Engineering Concentration** May 2017  
LeTourneau University, Longview, TX

## ACADEMIC APPOINTMENTS

- Assistant Professor** 2024-Present  
University of Arkansas, Fayetteville, AR
- Research Engineer** 2022-2024  
Purdue Applied Research Institute (PARI), West Lafayette, IN
- Graduate Research Assistant** 2017-2022  
Lyles School of Civil Engineering (Advisor: Amit Varma), Purdue University, West Lafayette, IN

## PUBLICATIONS

### Refereed Journal Articles

- Broberg, M.**, Agrawal, S., Varma, A., and Klemencic, R. (2023). "Seismic design parameters ( $R$ ,  $C_d$ , and  $\Omega_0$ ) for uncoupled composite plate shear walls–concrete filled (C-PSW/CF)." *Earthquake Engineering and Structural Dynamics*, 1- 22. <https://doi.org/10.1002/eqe.3917>
- Broberg, M.**, Shafaei, S., Kizilarslan, E., Seo, J., Varma, A. H., Bruneau, M., and Klemencic, R. (2022). "Capacity design of coupled composite plate shear walls – concrete-filled system." *Journal of Structural Engineering*, 148(4). [http://doi.org/10.1061/\(asce\)st.1943-541x.0003296](http://doi.org/10.1061/(asce)st.1943-541x.0003296)
- Shafaei, S., Varma, A. H., **Broberg, M.**, Klemencic, R. (2021). "Modeling the cyclic behavior of composite plate shear walls/concrete filled (C-PSW/CF)." *Journal of Constructional Steel Research*, 184. <http://doi.org/10.1016/j.jcsr.2021.106810>
- Kizilarslan, E., **Broberg, M.**, Shafaei, S., Varma, A. H., and Bruneau, M. (2021). "Non-linear analysis models for composite plate shear walls-concrete filled (C-PSW/CF)." *Journal of Constructional Steel Research*, 184. <http://doi.org/10.1016/j.jcsr.2021.106803>
- Kizilarslan, E., **Broberg, M.**, Shafaei, S., Varma, A. H., and Bruneau, M. (2021). "Seismic design coefficients and factors for coupled composite plate shear walls/ concrete filled (CC-PSW/CF)." *Engineering Structures*, 244. <http://doi.org/10.1016/j.engstruct.2021.112766>

## Manuscripts in Preparation

- Broberg, M.**, Kizilarlan, E., Seo, J., Shafaei, S., Varma, A., and Bruneau, M. (2024). "Nonlinear Models for Behavior of Composite Coupling Beams in Coupled Composite Plate Shear Walls—Concrete Filled (C-PSW/CF)." *Engineering Structures*, Manuscript in preparation.
- Lefebvre, A., **Broberg, M.**, Choe, L., and Varma, A. (2024). "Design of Full-Strength Steel-Plate Composite (SC) L-Joint Connections." *Journal of Constructional Steel Research*, Manuscript in preparation.

## Books

- Varma, A.H., **Broberg, M.**, Shafaei, S., and Taghipour, A. (2023). *Design Guide 38: SpeedCore Systems for Steel Structures*. Steel Design Guide Series 38. AISC.

## Conference Proceedings

- Broberg, M.**, Capa Salinas, J., Khalifah, S. (2024). "Lessons Learned through Multi-Year Team Teaching of an Engineering Course for Pre-College Students" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.
- Capa Salinas, J. and **Broberg, M.** (2024). "Creating a Pipeline of Civil Engineering Students Through Innovative Summer Course" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.
- Capa Salinas, J., Salmeron, M., Chobe, G., Montoya, H., **Broberg, M.** (2024). "Evaluation of Transfer of Learning in a Pre-College Engineering Short Course (Evaluation)" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.
- Broberg, M.**, Capa Salinas, J., Wagner, D. (2023). "A Pre-College Civil Engineering Course: Fostering Interest in Engineering Among High School Students and Developing Future Engineering Educators" *Proceedings of the Annual American Society of Engineering Education Conference*, Baltimore, MD, June 25-28, 2023.
- Capa Salinas, J., **Broberg, M.**, Wagner, D., (2023). "Evaluation of a High School Engineering Short Course Integrating the Engineering Design Process, Creativity, and Innovation (Evaluation)" *Proceedings of the Annual American Society of Engineering Education Conference*, Baltimore, MD, June 25-28, 2023.
- Broberg, M.**, Germann, C., Choe, L., Varma, A. (2023). "Behavior of Shear Connectors in Steel-Plate Composite Structures for Protective Structure Applications" *Proceedings of the 6<sup>th</sup> International Conference on Protective Structures*, Auburn, AL, May 14-17, 2023.
- Broberg, M.**, Lefebvre, A., Choe, L., Varma, A. (2023). "Design of Steel-Plate Composite (SC) L-Joint Connection" *Proceedings of the 6<sup>th</sup> International Conference on Protective Structures*, Auburn, AL, May 14-17, 2023.
- Broberg, M.**, Shafaei, S., and Varma, A. (2022). "Seismic Design of Coupled Composite Plate Shear Walls – Concrete-Filled" *Proceedings of the 12<sup>th</sup> National Conference on Earthquake Engineering*, Salt Lake City, UT, June 27-July 1, 2022.
- Shafaei, S., **Broberg, M.**, Varma, A. (2022). "Lateral Seismic Load Behavior and Design of Coupled Composite Plate Shear Walls / Concrete-Filled (CC-PSW/CFs)" *Proceedings of the 12<sup>th</sup> National Conference on Earthquake Engineering*, Salt Lake City, UT, June 27-July 1, 2022.
- Broberg, M.**, Bose, B., Pineda-Mendez, R. A., Devine, D., Gehr, R., Jange, C., McDermott, J., Loui, M., and Eisma, J. (2022). "Lessons learned – preparing graduate students and postdoctoral researchers for tenure track careers through mentoring circles" *Proceedings of the Annual American Society of Engineering Education Conference*, Minneapolis, MN, June 26-29, 2022.
- Broberg, M.**, Khalifah, S., Gupta, A., and Nafakh, A. (2021). "An Evaluation of a University-Level, High School Course Taught to Foster Interest in Civil Engineering (Evaluation)" *Proceedings of the Annual American Society of Engineering Education Conference*, Virtual, July 26-29, 2021.

**Broberg, M.**, Shafaei, S., Seo, J., Varma, A.H., and Agrawal, S. (2019). "Introduction to seismic analysis of coupled composite plate shear wall – concrete-filled (CC-PSW/CF)." *Proceedings of the Annual Stability Conference, Structural Stability Research Council*, St. Louis, MI, April 2-5, 2019.

Shafaei, S., Varma, A.H, **Broberg, M.**, and Seo, J. (2019). "An Introduction to Numerical Modeling of Composite Plate Shear Wall/ Concrete-Filled (C-PSW/CF)." *Proceedings of the Annual Stability Conference, Structural Stability Research Council*, St. Louis, MI, April 2-5, 2019.

Varma, A.H., **Broberg, M.**, and Shafaei, S (2019). "System Level Behavior of Coupled Composite Plate Shear Walls/Concrete-Filled (CC-PSW/CF)." *Proceedings of the Los Angeles Tall Buildings Structural Design Council Conference*, May 3, 2019.

## Data Sets

**Broberg, M.** and Varma, A.H. (2023). OpenSees Models for C-PSW/CF Archetype Structures. Purdue University Research Repository. <https://doi.org/10.4231/9H4P-Z894>

Varma, A. H., **Broberg, M.**, Shafaei, S., and Taghipour Anvari, A. (2022). SpeedCore Design Examples. (Version 2.0). Purdue University Research Repository. <http://doi.org/10.4231/ZVN1-4Q26>

## Technical Reports

Agrawal, S., **Broberg, M.**, and Varma, A. H., "Seismic Design Coefficients for SpeedCore or Composite Plate Shear Walls - Concrete Filled (C-PSW/CF)" (2020). Bowen Laboratory Research Reports. Lyles School of Civil Engineering, Purdue University. <http://doi.org/10.5703/1288284317125>

Bruneau, M., Varma, A. H., Kizilarslan, E., **Broberg, M.**, Shafaei, S., and Seo, J. (2019). "R- Factors for Coupled Composite Plate Shear Walls /Concrete Filled (CC-PSW/CF)." Charles Pankow Foundation Grant # 05-17, McLean, Virginia.

## Popular Press

Varma, A.H., **Broberg, M.**, Shafaei, S., and Anvari, A. (2023). "Designed for Speed." American Institute of Steel Construction, Modern Steel Construction.

**Broberg, M.**, Shafaei, S., and Seo, J. (2019). "SpeedCore and Composite Plate Shear Walls." American Institute of Steel Construction, Modern Steel Construction.

## PRESENTATIONS

### Conference Presentations

**Broberg, M.**, Capa Salinas, J., Khalifah, S. (2024). "Lessons Learned through Multi-Year Team Teaching of an Engineering Course for Pre-College Students" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.

Capa Salinas, J. and **Broberg, M.** (2024). "Creating a Pipeline of Civil Engineering Students Through Innovative Summer Course" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.

Capa Salinas, J., Salmeron, M., Chobe, G., Montoya, H., **Broberg, M.** (2024). "Evaluation of Transfer of Learning in a Pre-College Engineering Short Course (Evaluation)" *Proceedings of the Annual American Society of Engineering Education Conference*, Portland, OR, June 23-26, 2024.

**Broberg, M.**, Germann, C., Choe, L., Varma, A. "Behavior of Shear Connectors in Steel-Plate Composite Structures for Protective Structure Applications" 6<sup>th</sup> International Conference on Protective Structures, Auburn, AL, May 14-17, 2023.

**Broberg, M.,** Lefebvre, A., Choe, L., Varma, A. “Design of Steel-Plate Composite (SC) L-Joint Connection” 6<sup>th</sup> International Conference on Protective Structures, Auburn, AL, May 14-17, 2023.

**Broberg, M.,** Shafaei, S., and Varma, A. “Seismic Design of Coupled Composite Plate Shear Walls – Concrete-Filled” 12<sup>th</sup> National Conference on Earthquake Engineering, Salt Lake City, UT, June 27-July 1, 2022.

Varma, A.H., **Broberg, M.,** Shafaei, S., and Taghipour, A. “Sneak Peek: The New SpeedCore Design Guide” North American Steel Construction Conference, Denver, CO, March 23-25, 2022.

**Broberg, M.,** Khalifah, S., Gupta, A., and Nafakh, A. (2021). “An Evaluation of a University-Level, High School Course Taught to Foster Interest in Civil Engineering (Evaluation)” American Society of Engineering Education Conference, Virtual, July 26-29, 2021.

**Broberg, M.,** Shafaei, S., Seo, J., Varma, A.H., and Agrawal, S. (2019). “Introduction to seismic analysis of coupled composite plate shear wall – concrete-filled (CC-PSW/CF).” North American Steel Construction Conference, St. Louis, MI, April 2-5, 2019.

### Invited Talks

**Broberg, M.** (2019). “Behavior of Coupled Composite Plate Shear Walls” Invited Presentation, Invited Presentation, Wabash College, Crawfordsville, IN.

**Broberg, M.** (2019). “Behavior of Coupled Composite Plate Shear Walls (SpeedCore)” Invited Presentation, Cedarville University, Cedarville, OH.

### Local Meetings

**Broberg, M.,** Shafaei, S., Varma, A. H. (2022). “Design of Coupled Composite Plate Shear Walls for Seismic Applications” Poster at Civil Engineering Graduate Research Symposium, Purdue University, West Lafayette, IN.

**Broberg, M.,** Shafaei, S., Varma, A. H. (2021). “Design of SpeedCore Walls for Seismic Applications” Poster at Graduate Women in Engineering Symposium, Purdue University, West Lafayette, IN.

**Broberg, M.,** Shafaei, S., Agrawal, S., Seo, J., Varma, A. H. (2019). “Introduction to SpeedCore Walls” Presentation at Indiana Structural Engineering Association Meeting, West Lafayette, IN.

### TEACHING

#### Instructor

CVEG5370 Advanced Structural Steel Design	Fall 2024
CE299 Developing Infrastructure for Tomorrow	Summer 2021, 2022
CE299 Resiliency & Sustainability in Civil Engineering	Summer 2020

#### Co-Instructor and Teaching Assistant

CE697 Seismic Design of Steel Structures	Fall 2021, Spring 2022
CE597 Structural Stability	Summer 2021
CE570 Advanced Structural Steel Design	Spring 2020, Spring 2021

#### Teaching Assistant

CE570 Advanced Structural Steel Design	Fall 2020
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#### Supplemental Instructor

CEGR4834 Structural Steel Design	Spring 2017
CEGR3313 Structural Analysis	Fall 2016

## AWARDS & HONORS

NHERI Summer Institute for Early-Career Faculty NSF Travel Award, National Hazards Engineering Research Infrastructure (NHERI)	Summer 2024
NHERI at UC San Diego User Training Workshop Travel Grant, University of San Diego	Fall 2023
NSF NHERI Wall of Wind Facility User Workshop Travel Grant, Florida International University	Fall 2023
Purdue Doctoral Fellow, Purdue University	2017-2022
Graduate Student Engagement Award, Purdue Lyles School of Civil Engineering	Fall 2022
NHERI Summit Travel Grant, NHERI	Fall 2022
WiscProf Future Faculty in Engineering Workshop Participant, Univ. of Wisconsin-Madison	Summer 2022
Civil Engineering Graduate Research Symposium – Best Poster, Purdue University	Spring 2022
College of Engineering Conference Travel Grant, Purdue University	Spring 2022
PGSG Travel Grant, Purdue University	Spring 2022
Civil Engineering Professional Development Scholarship, Purdue University	Spring 2021
Distinguished Senior Award (Top Five Undergraduate Seniors), LeTourneau University	Spring 2017
R.G. LeTourneau Award (Top Engineering Student), LeTourneau University	Spring 2017
Summa Cum Laude, LeTourneau University	Spring 2017

## LEADERSHIP & SERVICE

Reviewer, Journal of Structural Engineering	2021-Present
Reviewer, Structures	2023-Present
Reviewer, Journal of Bridge Engineering	2024-Present
American Society of Civil Engineering, Associate Member	2015-Present
Earthquake Engineering Research Institute, Member & Younger Members Committee Member	2022-Present
American Institute of Steel Construction, Member	2024-Present
Structural Stability Research Council, Member	2024-Present