Andrew David Sen

Curriculum Vit

Engineering Hall, 209
Marquette University
P.O. Box 1881
Milwaukee, WI 53201-1881

+1-919-810-2952
andrew.sen@marquette.edu

Educational History

University of Washington / Seattle, WA
Doctor of Philosophy in Civil Engineering
December 2018
Dissertation: *New Methods for Seismic Performance Evaluation and Retro t of Nonductile Concentrically Braced Frames*
<http://hdl.handle.net/1773/43337>

University of Washington / Seattle, WA
Master of Science in Civil Engineering
December 2014
Thesis: *Seismic Performance of Chevron Concentrically Braced Frames with Weak Beams*
<http://hdl.handle.net/1773/27443>

North Carolina State University / Raleigh, NC
Bachelor of Science in Civil Engineering
Minor in Environmental Science
May 2012
Honors: Valedictorian, *summa cum laude*, University Scholars Program

The University of Auckland / Auckland, NZ
Certi cate of Pro ciency { Overseas (Study Abroad)
July 2011{November 2011

Employment History

Assistant Professor August 2020{present
Marquette University, Milwaukee, WI
Department of Civil, Construction and Environmental Engineering

Postdoctoral Scholar

Graduate Research Assistant July 2016{August 2017
University of Washington, Seattle, WA
Department of Civil and Environmental Engineering

Graduate Research Assistant March 2013{June 2013
University of Washington, Seattle, WA
Department of Civil and Environmental Engineering

Awards and Honors

Charles H. Norris Award

5. Li, T., Mara , N. A., Sen, A. D., Berman, J. W., Eberhard, M. O., Lehman, D. E., and Roeder, C. W. (2019). \Seismic performance of special concentrically braced frames in deep basins during subduction-zone earthquakes." *Engineering Structures*, 188. <https://doi.org/10.1016/j.engstruct.2019.02.057>.

6. Sen, A. D., Swatosh, M. A., Ballard, R., Sloat, D., Johnson, M. M., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2017). \Development and evaluation of seismic retro t alternatives for older concentrically braced frames." *Journal of Structural Engineering*, ASCE, 143(5). <http://dx.doi.org/10.1061/(ASCE)ST.1943-541X.0001738>.

7. Sen, A. D., Roeder, C. W., Berman, J. W., Lehman, D. E., Li, C. H., Wu, A. C., and Tsai, K. C. (2016). \Experimental investigation of chevron concentrically braced frames with yielding beams." *Journal of Structural Engineering*, ASCE, 142(12). <http://dx.doi.org/10.1061/(ASCE)ST.1943-541X.0001597>.

8. Sen, A. D., Sloat, D., Ballard, R., Johnson, M. M., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2016). \Experimental evaluation of the seismic vulnerability of braces and connections in older concentrically braced frames." *Journal of Structural Engineering*, ASCE, 142(9). <http://dx.doi.org/10.1061/(ASCE)ST.1943-541X.0001507>.

Under review

1. Tan, Q., Lehman, D. E., Roeder, C. W., Berman, J. W., Sen, A. D., and Wu, B. (2020). \Design-parameter study on seismic performance of chevron-con gured SCBFs with yielding beams." Submitted to *Journal of Constructional Steel Research*.

In preparation

1. Sen, A. D., Roeder, C. W., Lehman, D. E., and Berman, J. W. \Seismic performance evaluation and retro t of nonductile concentrically braced frames."

2. Sen, A. D., Lehman, D. E., and Lowes, L. N. \Fiber-based assemblage approach for modeling exure-shear and shear failure of reinforced-concrete columns."

3. Sen, A. D., Sumearll, J., Lehman, D. E., and Lowes, L. N. \Seismic performance evaluation of a reinforced-concrete moment-frame building damaged in the 2016 Meinong Earthquake."

Conference proceedings and other non-journal articles

Fully refereed publications

1. Pregnolato, M., Bates, P., Winter, A. O., Mascarenas, D., Sen, A. D., and Motley, M. R. (2020). "An integrated impact analysis for riverine bridges subjected to high river ows." *Proceedings of the 10th International Conference on Bridge Maintenance, Safety and Management*, Sapporo, Japan, June 2020 (postponed).

2. Sen, A. D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2018). \Seismic performance of nonductile and retro tted concentrically braced frame buildings." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

3. Sen, A. D., Swatosh, M. A., Ballard, R., Johnson, M. M., Sloat, D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2018). \Seismic evaluation and retro t of vulnerable concentrically braced frames." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

4. Lehman, D. E., Sen, A. D., Sloat, D., Roeder, C. W., and Berman, J. W. (2018). \Revised ASCE-41 modeling recommendations for concentrically braced frames."

5. Sen, A. D., Cakir, R., and Mara , N. A. (2018). \Seismic risk assessment and educational outreach for schools in Central Washington." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

6.

Other Scholarly Activity

Presentations given at conferences

1. Sen, A. D., Lehman, D. E., and Lowes, L. N. (2019). \Evaluation of nonlinear analysis procedures using observed earthquake damage." *QuakeCoRE International Workshop on Post-Earthquake Residual Capacity and Repairability of Concrete Buildings*, Auckland, NZ, February 2019.

2. Sen, A. D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2018). \Seismic performance of nonductile and retro tted concentrically braced frame buildings." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

3. Sen, A. D., Swatosh, M. A., Ballard, R., Johnson, M. M., Sloat, D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2018). \Seismic evaluation and retro t of vulnerable concentrically braced frames." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

4. Sen, A. D., Cakir, R., and Mara , N. A. (2018). \Seismic risk assessment and educational outreach for schools in Central Washington." *Proceedings of the 11th National Conference on Earthquake Engineering*, Los Angeles, CA, June 2018.

5. Sen, A. D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2018). \Seismic performance evaluation of older and retro tted concentrically braced frames using nonlinear response-history analysis." *ASCE/SEI Structures Congress 2018*, Fort Worth, TX, April 2018.

6. Sen, A. D., Roeder, C. W., Lehman, D. E., Berman, J. W., Terpstra, C., and Ibarra, S. (2018). \The behavior of chevron braced frames with yielding beams." *ASCE/SEI Structures Congress 2018*, Fort Worth, TX, April 2018.

7. Sen, A. D., Swatosh, M., Sloat, D., Johnson, M., Ballard, R., Berman, J. W., Lehman, D. E., and Roeder, C. W. (2017). \Seismic vulnerability and rehabilitation of older concentrically braced frames." *Proceedings of the 16th World Conference on Earthquake Engineering*, Santiago, Chile, January 2017.

8. Sen, A. D., Palmer, K., Pan, L., Roeder, C. W., Lehman, D. E., Berman, J. W. (2015). \Evaluation of chevron concentrically braced frames with weak beams." *2nd ATC-SEI Conference on Improving the Seismic Performance of Existing Buildings and Other Structures*, San Francisco, CA, December 2015.

9. Sen, A. D., Ballard, R., Sloat, D., Johnson, M. M., Pan, L., Roeder, C. W., Berman, J. W., Lehman, D. E., Tsai, K. C., Li, C. H., and Wu, A. C. (2015). \Seismic performance evaluation and rehabilitation of pre-capacity design concentrically braced frames." *ASCE/SEI Structures Congress 2015*, Portland, OR, April 2015.

10. Sen, A. D., Pan, L., Sloat, D., Roeder, C. W., Lehman, D. E., Berman, J. W., Tsai, K. C., Li, C. H., and Wu, A. C. (2014). \Numerical and experimental assessment of chevron braced frames with weak beams." *Proceedings of the 10th National Conference on Earthquake Engineering*, Anchorage, AK, July 2014.

Abstracts accepted

1. Sen, A. D., Sumearll, J., Lehman, D. E., and Lowes, L. N. (2020). \Restrospective evaluation of earthquake-damaged reinforced-concrete buildings using practical methods." *17th World Conference on Earthquake Engineering*, Sendai, Japan, September 2021.

2. Sen, A. D., Roeder, C. W., Lehman, D. E., and Berman, J. W. (2020). \Seisimc performance evaluation and retro t of nonductile concentrically braced frames." *17th World Conference on Earthquake Engineering*, Sendai, Japan, September 2021.

Invited lectures and seminars

1. \Seismic vulnerability and retro t of concentrically braced frames." Earthquake Hazard Group Virtual Seminar, Risk Management Solutions, Inc., October 2020.
2. \Seismic evaluation and practical retro t of vulnerable concentrically braced frames." Marquette University, February 2020.
3. \Practical seismic rehabilitation of concentrically braced frames." University of Minnesota, January 2020.
4. \New developments for seismic design, evaluation, and retro t of concentrically braced frames." University of Nevada, Las Vegas, January 2020.
5. \Advances in seismic performance evaluation and rehabilitation of concentrically braced frames." University of California, San Diego, March 2019.
6. \Advances in seismic performance evaluation and rehabilitation of concentrically braced frames." University of Southern California, March 2019.
7. \Seismic performance evaluation and retro t of concentrically braced frames." The George Washington University, November 2018.
8. \Innovation through rehabilitation in the seismic design of concentrically braced frames." North Carolina State University, February 2018.
9. \Seismic performance evaluation and retro t of vulnerable concentrically braced frames." University of California, Berkeley, February 2018.
10.

Reports

1. Roeder, C. W., Lehman, D. E., Berman, J. W., Sen, A. D., Ibarra, S., Terpstra, C., and Liu, R. (2018). \Final report: Improving seismic design of chevron-con gured braced frames." Report to Sponsor: American Institute of Steel Construction.

2. Roeder, C. W., Lehman, D. E., Berman, J. W., Sen, A. D., Ibarra, S., Terpstra, C., and Liu, R. (2017). \Incremental report: Improving seismic design of chevron-con gured braced frames." Report to Sponsor: American Institute of Steel Construction.

3. Sen, A. D., Mara , N. A., and Yang, T. (2017). \Rapid visual screening of school buildings toward a seismically resilient Central Washington." Report to Sponsor: Washington Geological Survey.

Curated data sets

1. Sen, A. D., Roeder, C. W. [P.I.], Lehman, D. E., Berman, J. W., and Tsai, K. C. (2015). \TNCBF1-N-HSS: Taiwan Non-Seismic Concentrically Braced Frame (NCBF) with Non-Ductile Details and HSS Braces." DesignSafe-CI (formerly Network for Earthquake Engineering Simulation). <http://dx.doi.org/DOI:10.4231/D31C1TG76>.

2. Sen, A. D., Roeder, C. W. [P.I.], Lehman, D. E., Berman, J. W., and Tsai, K. C. (2015). (2015). \TNCBF1-R-HSS: Taiwan Non-Seismic Concentrically Braced Frame (NCBF) with Repaired First Story and HSS Braces." DesignSafe-CI (formerly Network for Earthquake Engineering Simulation). <http://dx.doi.org/DOI:10.4231/D3Q23R15F>.

3. Sen, A. D., Roeder, C. W. [P.I.], Lehman, D. E., Berman, J. W., and Tsai, K. C. (2015). (2015). \TNCBF1-R-WF: Taiwan Non-Seismic Concentrically Braced Frame (NCBF) with Repaired First Story and Wide Flange Braces." DesignSafe-CI (formerly Network for Earthquake Engineering Simulation). <http://dx.doi.org/DOI:10.4231/D3K931725>.

4. Sen, A. D., Roeder, C. W. [P.I.], Lehman, D. E., Berman, J. W., and Tsai, K. C. (2015). (2015). \TNCBF2-D-HSS: Taiwan Non-Seismic Concentrically Braced Frame (NCBF) with Ductile Details and HSS Braces." DesignSafe-CI (formerly Network for Earthquake Engineering Simulation). <http://dx.doi.org/DOI:10.4231/D3FN10S9R>.

Journal p0d[ɦ0S9R]Tfs]Survey.

Teaching Activity

Courses taught

Fall 2020
Course: CEEN 3430 { Structural Steel Design (Marquette)
Credit hours: 3
Enrollment: 44 students

Autumn 2019
Course: CEE 451 { Design of Metal Structures (UW)
Credit hours: 3
Evaluation responses: 15/52 students

Item	Adjusted median rating
Course content	4.1/5.0
Instructor contribution	4.4/5.0
Teaching e ectiveness	3.7/5.0

Autumn 2017
Course: CEE 451 { Design of Metal Structures (UW)
Credit hours: 3
Evaluation responses: 35/55 students

Item	Adjusted median rating
Course content	4.6/5.0
Instructor contribution	4.9/5.0
Teaching e ectiveness	4.9/5.0

Membership

American Society of Civil Engineers

American Institute of Steel Construction

Earthquake Engineering Research Institute
(President of University of Washington Student Chapter, 2016{2018)

Tau Beta Pi Engineering Honor Society, NC Alpha Chapter

University of Washington High-Performance Computing Club (2017{2018)

Licensure

Engineering Intern, State of North Carolina, 2012

Service

University service

Mary Gates Research Scholarship Review Panel (UW) 2019
Details: Reviewer for undergraduate research scholarships

Department service

Student Steel Bridge Competition Faculty Advisor 2020
Details: Support for Marquette ASCE Student Chapter members competing in AISC SSBC

Community outreach

Unitigers First Lego League Robotics Team Review Panel 2019
Details: Question/answer session and advising on seismic retro t topics for middle-school students

University of Washington Engineering Discovery Days RAPID Facility Exhibit 2019
Details: Guide for simulated earthquake damage scavenger hunt for K-12 students

Rapid Visual Screening of Schools in Central Washington 2017
Details: 44 campuses surveyed for potential seismic hazards in Chelan and Okanogan Counties

School Earthquake Safety Initiative Educational Outreach in Wenatchee, WA 2017
Details: Instructor for earthquake engineering lessons at two (2) elementary schools based upon EERI curriculum

University of Washington Structural Research Laboratory Tours 2016-2017
Details: Laboratory tours and introduction to structural engineering for K-12 summer camp groups

University of Washington Engineering Discovery Days \Make It and Shake It" Exhibit 2014-2017, 2019
Details: Participant in and coordinator of interactive shake table demonstrations for K-12 students

University of Washington Engineers Without Borders Student Chapter 2016
Details: Advising for design and analysis of community center in Guatemala

Non-academic service

NC State Center for Student Leadership, Ethics, and Public Service (CSLEPS) Alternative Service Break (ASB), Nicaragua via El Porvenir 2011
Details: Assisted construction of wash station and gray-water well for the community of San Nicolas, Leon, Nicaragua