BARBARA SIMPSON, Ph.D.

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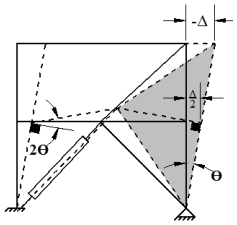

EDUCATION

Ph.D. **University of California, Berkeley**, CA
Civil Engineering, May 2018
Dissertation: Design Development for Steel Strongback Braced Frames to Mitigate Damage Concentration
Doctoral thesis research conducted with Stephen A. Mahin
Minors: Continuum and Computational Mechanics (FEA); Mathematical Numerical Analysis

National Taiwan University, Taipei, Taiwan
Visiting Scholar, summer 2015

M.S. **University of California, Berkeley**, CA
Civil Engineering, May 2013

B.S. **University of Kansas**, Lawrence, KS
Architectural Engineering, Minor: English, December 2011

ACADEMIC EXPERIENCE AND RESEARCH

Assistant Professor, School of Civil and Construction Engineering, Oregon State University 2018-Present
Areas of Research Interests: the design of innovative and resilient structures, earthquake engineering, structural dynamics, hybrid simulation, numerical analysis

The development of an innovative spine, or "strongback," structural system 2012-present
Pioneered the development and design methods for the strongback frame, a system that utilizes a vertical steel truss, or spine, to mitigate weak story behavior during a strong earthquake (NSF grant CMMI-1208002, AISC fellowship, 2017)

Experimental and analytical investigation of older braced frame systems 2012-present
NEES-2012-1157 "Collaborative Developments for Seismic Rehabilitation of Vulnerable Braced Frames"
Collaborative program between UC Berkeley, University of Washington, and National Taiwan University researching the behavior of older steel braced frame systems under earthquake shaking (NSF grant CMMI-1208002).

PUBLICATIONS

Simpson, B., Mahin, S. 2018. Experimental and Numerical Investigation of Strongback Braced Frame System to Mitigate Weak Story Behavior. *J. Struct. Eng*. 144(2): 04017211, DOI: 10.1061/(ASCE)ST.1943-541X.0001960

Simpson, B., Mahin, S. 2018. Experimental and Numerical Evaluation of Older Chevron Concentrically Braced Frames with Hollow and Concrete-Filled Braces. *J. Struct. Eng*. 144(3): 04018007, DOI: 10.1061/(ASCE)ST.1943-541X.0001988

Simpson, B. 2018. Study Spine: Developing a design methodology for steel strongback braced frames. *Modern Steel Construction*. April 2018

TECHNICAL REPORTS

Simpson, B. 2018. "Design Development for Steel Strongback Braced Frames to Mitigate Concentrations of Damage," *Ph.D. Dissertation*, University of California, Berkeley, CA.

Simpson, B., Mahin, S., and Lai, J.W. 2017. "Experimental Investigation of the Behavior of Vintage and Retrofit Concentrically Braced Steel Frames under Cyclic Loading," *PEER Rept. 2017/12*, Pacific Earthquake Engineering Research Center (PEER), University of California, Berkeley, CA.

PEER-REVIEWED CONFERENCE PAPERS (other relevant papers, posters, and presentations listed at end)

Simpson, B., Mahin, S. 2018. "Design Development of a Four-story Strongback Braced Frame," *Key Engineering Materials: Behavior of Steel Structures in Seismic Areas.* 763: 1050-1057, DOI: 10.4028/www.scientific.net/KEM.763.1050

Simpson B. 2018. "Teaching School Safety and Advocacy in the Classroom," *Proceedings, 11th National Conference on Earthquake Engineering*: Los Angeles, CA.

Simpson B. and Mahin, S. 2018. "Analytical Investigation of Offset Geometries in Steel Strongback Braced Frames," *Proceedings, 11th National Conference on Earthquake Engineering*: Los Angeles, CA.

Simpson B. "Reducing concentrations of damage with a strongback system," EERI Earthquake Engineering Research Institute Graduate Student Paper Competition, *winner*, 2017.

Simpson B. and Mahin, S. "Seismic Assessment of the "Strongback" System," WCEE17 World Conference on Earthquake Engineering: Santiago, Chile 2017.

Simpson B. and Mahin, S. "Quasistatic Experimental Testing of Vulnerable Concentric Braced Frames," STESSA'15: The 8th International Conference on Behaviour of Steel Structures in Seismic Areas: Tongji University, Shanghai, China 2015.

JOURNAL PAPERS IN PROGRESS

Simpson, B. and Mahin, S. "Analytical investigation of strongback geometries with offset configurations," *in preparation.*
Simpson, B. "Characterization of Higher-Mode Effects in Strongback Braced Frames," *in preparation.*
Simpson, B. "Design Strategies to Incorporate Higher-Mode Effects in Strongback Braced Frames," *in preparation.*

EXPERIMENTAL TESTS

1. Two-story one bay chevron braced frame designed to the 1982 UBC, DOI:10.4231/D3SJ19S25
2. Two-story one bay chevron braced frame repair with concrete-filled braces (CFT), DOI:10.4231/D3NV99B9M
3. Two-story one bay chevron braced frame retrofit with innovative strongback (SB) system, DOI:10.4231/D32R3NZ0W

PROFESSIONAL EXPERIENCE

Thornton Tomasetti, Los Angeles, CA 2012
7-month Structural Design Internship
Analyzed the structural systems for the Pomona Art Center, ARTIC, and Edison Language Academy projects.
Explored potential floor systems for the design development stage of the Wilshire Grand High Rise.

Thornton Tomasetti, Kansas City, CA Summer 2011
Structural Design and Forensics Internship
Forensic analysis and documentation of the tornado damage done on the St. Louis Lambert International Airport.
Analyzed existing and new load cases for the south expansion of Lambeau Field.

McCownGordon Construction, L.L.C., Greensburg, KS Summer 2010
Project Engineering Internship
Construction management for the LEED Platinum K-12 Kiowa County School in Greensburg, KS.

PROFESSIONAL SERVICE & COMMUNITY OUTREACH

EERI School Earthquake Safety Initiative (SESI), STEM Volunteer 2015-present
Instructed and organized an outreach pilot program on earthquake engineering and structural design targeting local underrepresented 4th grade students in Oakland, CA through EERI School Earthquake Safety Initiative (SESI).

Build Change, Volunteer 2015-2017
Volunteered with the nonprofit group Build Change on efforts to prepare design recommendations for code revisions in Nepal after the recent 2015 Nepal Earthquake.

HONORS & FELLOWSHIPS (other relevant honors listed at end)

P.E.O. International Scholar 2017-2018
Award Amount: $15,000

Earthquake Engineering Research Institute (EERI) Graduate Student Paper Competition 2017
Winner, "Reducing concentrations of inelastic demand with a strongback," by Barbara Simpson

Earthquake Engineering Research Institute (EERI) Learning from Earthquakes (LFE) Study Program 2017
One of fifteen chosen for post-earthquake reconnaissance activities to explore community resilience after the 2010 earthquake in Chile

NSF East Asia Pacific Summer Institutes (EAPSI) Fellowship 2015
National Taiwan University, Taipei, Taiwan
Visiting Scholar with research host, K.C. Tsai
Award Amount: NSF $5,000, Taiwan Ministry of Science and Technology (MOST): $1,366

Earthquake Engineering Research Institute (EERI) Graduate Student Paper Competition 2014
Honorable Mention

UC Berkeley SEMM Masters Fellowship 2013
Recipient of a full-tuition with stipend to attend UC Berkeley's master's program.

Thornton Tomasetti Graduate Fellowship 2012
Award Amount: $10,000

CONFERENCE PAPERS CONTINUED

Simpson B. and Mahin, S. "Seismic vulnerability assessment of current, older, and strongback steel braced frame systems," SEAOC16 Convention: Recovering, learning, and rebuilding after recent Pacific Rim Earthquakes: Lahaina, HI, 10-2016

Simpson B. and Mahin, S. "EAPSI: Evaluating the seismic performance of a new building "spine" technology," East Asia Pacific Summer Institute (EAPSI) Research Fellows: 2015 Final SIT Project Report: Taipei, Taiwan 2015.

Simpson B. and Mahin, S. "Quasistatic Cyclic Testing of a Strongback System," EERI 2014 Graduate Student Paper Competition (*Honorable Mention*), 2015 EERI Annual Meeting: Boston, Massachusetts 03-2015

Simpson B. and Mahin, S. Workshop: "NEES16: Collaborative Developments for the Rehabilitation of Vulnerable Braced Frames." Steel Structures Session, Ten Successful Years of Research within nees@berkeley: Berkeley, CA 05-2014.

TECHNICAL REPORTS

Kakoty, P., **Simpson, B.**, Ortega, M. and Hassan, W. "Tsunami Resilience Observation Report by EERI and CIGIDEN: Healthcare Resilience Observation Report," Earthquake Engineering Research Institute (EERI) Illapel, Chile Earthquake Clearinghouse, 2017.

Kakoty, P., **Simpson, B.**, Ortega, M. and Hassan, W. "Resilience Reconnaissance Observation Report by EERI and CIGIDEN: Tsunami Evacuation Zone I," Earthquake Engineering Research Institute (EERI) Illapel, Chile Earthquake Clearinghouse, 2017.

INTERNATIONAL / NATIONAL PRESENTATIONS

Simpson B. 2018. "Teaching School Safety and Advocacy in the Classroom," *Presentation,* 11th National Conference on Earthquake Engineering: Los Angeles, CA 06-2018.

Simpson B. 2018. "Analytical Investigation of Offset Geometries in Steel Strongback Braced Frames," *Presentation*, 11th National Conference on Earthquake Engineering: Los Angeles, CA 06-2018.

Simpson, B. 2018. "AISC Research: Development of a design methodology for steel strongback braced frames," *Presentation*, 2018 NASCC: The Steel Conference: Baltimore MD 04-2018.

Simpson, B. 2018. "Design Development of a Four-story Strongback Braced Frame," *Key Engineering Materials: Behavior of Steel Structures in Seismic Areas*: Christchurch, NZ 02-2018.

Simpson B. "Seismic Assessment of the "Strongback" System," WCEE17 World Conference on Earthquake Engineering: Santiago, Chile 01-2017.

Simpson B. "Seismic vulnerability assessment of current, older, and strongback steel braced frame systems," SEAOC16 Convention: Recovering, learning, and rebuilding after recent Pacific Rim Earthquakes: Lahaina, HI, 10-2016

Simpson, B. "The Weak Story Solution: Quasistatic Experimental Testing of a Braced Frame Retrofit." *Presentation*, Young Researchers Workshop, Tokyo Institute of Technology: Tokyo, Japan, 03-15-2015.

Simpson, B. "Experimental Testing of Vulnerable Concentric Braced Frames." 6th Kwang-Hua Forum, Student Session: Shanghai, China, *Presentation* 12-10-2014.

Simpson, B. "Vulnerability and retrofit of older braced frames." Advanced Steel Structures Break-Out Discussion, 10th NEES/E-Defense Meeting Session: Kyoto, Japan, *Presentation* 12-2013.

LOCAL PRESENTATIONS

Panian, L. and **Simpson, B.** "Research and Implementation of the Buckling Restrained Braced Mast System." SEAONC Dinner Meeting: San Francisco, CA, *Presentation* 02-02-2016.

Panian, L. and **Simpson, B.** "Research to Practice: Research and Implementation of the Buckling Restrained Braced Mast System." SEMM & PEER Seminar: Berkeley, CA, *Presentation* 10-26-2015.

Simpson, B. "Vulnerable Behavior in Older Concentric Braced Frames." SEAONC Younger Researcher's Forum: San Francisco, CA, *Presentation* 06-09-2015.

Simpson, B. "NEES16: Collaborative Developments for the Rehabilitation of Vulnerable Braced Frames." Steel Structures, Workshop: Ten Successful Years of Research within nees@berkeley: Berkeley, CA, *Presentation* 05-2014.

POSTERS

Simpson B. and Mahin, S. "Higher mode effects in strongback braced frames," PEER Annual Meeting: Berkeley, CA, *Poster* 01-2018.

Simpson B. and Mahin, S. "Analysis of a "strongback" system," EERI16 68th Annual Meeting: San Francisco, CA, *Poster* 04-2016.

Simpson B. and Mahin, S. "Preliminary analysis of a "strongback" system," PEER Annual Meeting: Berkeley, CA, *Poster* 01-2016.

Simpson B. and Mahin, S. "EAPSI: Evaluating the seismic performance of a new building "spine" technology," East Asia Pacific Summer Institute (EAPSI) Research Fellows: 2015 Final SIT Project Exhibition: Taipei, Taiwan, *Poster*, 08-2015.

Simpson B. and Mahin, S. "Quasi-static Cyclic Testing of Older Vulnerable Concentrically Braced Frames," 10NCEE: 10th U.S. National Conference on Earthquake Engineering: Anchorage, Alaska, *Poster* 07-2014.

UNDERGRADUATE PAPERS

Simpson, B. and Matamoros A.B., "Criteria for Evaluating the Effect of Displacement History and Span-to-Depth Ratio on the Risk of Collapse of R/C Columns," WCEE15 World Conference on Earthquake Engineering: Lisbon, Portugal 2015.

Simpson, B. "Development of Hybrid Simulation Models," NEES Research Experience for Undergraduates: University of Illinois, Urbana-Champaign, IL 2009.

Other Honors and Awards: UC Berkeley Engineer of the Week, Brosseau Creative Writing Award, Undergrad. English Dept. Essay Award**,** American Concrete Institute (ACI) Scholarship, Concrete Reinforcing Steel Institute (CRSI) Scholarship, Associated General Contractors (AGC) Scholarship, American Council of Engineering Companies (ACEC) Scholarship, Bartlett and West Scholarship