

Katherine G. Kuder

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Education

Ph.D., Civil and Environmental Engineering (2005)
Northwestern University, Evanston, IL

M.S., Civil and Environmental Engineering (2002)
Northwestern University, Evanston, IL

B.S., Civil Engineering (2000)
Gonzaga University, Spokane, WA

Professional

Professional Civil Engineer, certified by the state of Washington, 2012 (50078)

Employment History

- 7/13 – present Chair, Department of Civil and Environmental Engineering Seattle University, Seattle, WA
- 9/16 – present Professor, Department of Civil and Environmental Engineering Seattle University, Seattle, WA
- 7/11 – 8/16 Associate Professor, Department of Civil and Environmental Engineering Seattle University, Seattle, WA
- 9/05 – 6/11 Assistant Professor, Department of Civil and Environmental Engineering Seattle University, Seattle, WA
- 9/00 – 7/05 Graduate Research Assistant, Center for Advanced Cement-Based Materials (ACBM), Department of Civil and Environmental Engineering, Northwestern University
- 9/03 – 3/04 Graduate Teaching Assistant, Department of Civil and Environmental Engineering, Northwestern University

Publications

Refereed Journal Articles (underline indicates student co-author)

- J15** Tinnea, R., Tinnea, J. **Kuder, K.**, “High Early Strength, High Resistivity Concrete for Direct Current Light Rail,” *Journal of Materials in Civil Engineering*, 29(4), April 2017.
- J14** Chen, J., **Kuder, K.**, Lehman, D., Roeder, C., Lowes, L., “Creep Modeling of Concretes with High Volumes of Supplementary Cementitious Materials and its Application to Concrete-Filled Tubes,” *Materials and Structures*, 50(1), February 2017.

- J13 Kuder, K.**, Gnanapragasam, N., Smith, J.P., "Role and Impact of Structural Retrofit Capstone Projects," *International Journal of Engineering Education*, 31(6B), 2015.
- J12** Lehman, D., **Kuder, K.**, Gunnarsson, A., Roeder, C.; Berman, J. "Circular Concrete Filled Tubes for Improved Sustainability and Seismic Resilience," *Journal of Structural Engineering*, 131(3), March 2015.
- J11** Gupta, R., **Kuder, K.**, "Effect of Formwork, Wall Thickness, and Addition of Fly Ash on Concrete Hydration," *Advances in Civil Engineering Materials*, 3 (1), 2014, pp. 479-494.
- J10 Kuder, K.**, Lehman, D., Berman, J., Hannesson, G. Shogren, R. "Mechanical Properties of Self Consolidating Concrete Blended with High Volumes of Fly Ash and Slag," *Construction and Building Materials*, 34, September 2012, pp. 285-295.
- J9** Hannesson, G., **Kuder, K.**, Shogren, R., Lehman, D. "The Influence of High Volume of Fly Ash and Slag on the Compressive Strength of Self-Consolidating Concrete," *Construction and Building Materials*, 30(3), May 2012, pp. 161-168.
- J8 Kuder, K.G.**, Gupta, R., Lowrie, K., Sommer, D., Wheeler, N. "Practical Test Method and Use of Novel Temperature Development Index for Evaluating Concrete Development," *Experimental Techniques*, 35(4), July/August 2011, pp. 17-22.
- J7 Kuder, K.G.** and Shah, S.P. "Processing of High-Performance Fiber-Reinforced Cement-Based Composites." *Construction and Building Materials: Special Issue on Inorganic-Bonded Fiber Composites*, 24(2), February 2010, pp. 181-186.
- J6 Kuder, K.G.**, Gupta, R., Harris-Jones, C., Hawksworth, R., Henderson, S. and Whitney, J. "Effect of PVC Stay-In-Place Formwork on Mechanical Performance of Concrete." *American Society of Civil Engineers (ASCE) Journal of Materials in Civil Engineering*, 21(7), July 2009, pp. 309-315.
- J5 Kuder, K.G.** and Shah, S.P. "Tailoring Extruded HPFRCC to be Nailable." *American Concrete Institute (ACI) Materials Journal*, 104(5), September-October 2007, pp. 526-534.
- J4 Kuder, K.G.** and Shah, S.P. "Rheology of Extruded Cement-Based Composites." *ACI Materials Journal*, 104(3), May-June 2007, pp. 283-290.
- J3 Kuder, K.G.**, Ozyurt, N., Mu, E.B. and Shah, S.P. "Rheology of Fiber-Reinforced Cementitious Materials." *Cement and Concrete Research*, 37(2), February 2007, pp.191-199.
- J2 Kuder, K.G.**, Mu, E.B. and Shah, S.P. "New Method to Evaluate the Nailing Performance of Extruded High-Performance Fiber-Reinforced Cementitious Composites for Residential Applications." *ASCE Journal of Materials in Civil Engineering*, 18(3), May/June 2006, pp. 443-452.
- J1 Kuder, K.G.** and Shah, S.P. "The Effects of Pressure on Resistance to Freezing and Thawing of Fiber-Reinforced Cement Board." *ACI Materials Journal*, 100(6), November-December 2003, pp. 463-468.

Refereed Conference Publications (*indicates presenter at conference, underline indicates student co-author)

- C18 Kuder, K. ***, Lehman, D., Chen, J., Roeder, C., Lowes, L. "Creep Modeling of Self Consolidating Concrete with High Volumes of Supplementary Cementitious Materials and

Applications in Concrete-Filled Tubes," *Fourth International Conference on Sustainable Construction Materials and Technologies*, Las Vegas, NV, August 2016, online.

- C17 Kuder, K.***, Lehman, D., Chen, J., Roeder, C., Lowes, L. "Creep Modeling of Self Consolidating Concrete with High Volumes of Supplementary Cementitious Materials," *8th International RILEM Symposium on Self-Compacting Concrete - SCC2016*, Washington DC, May 2016.
- C16 Smith, J.P.***, **Kuder, K.***, Gnanapragasam, N. "Learning Challenges and Opportunities from Seismic Retrofit Capstone Projects," *2015 Annual American Society for Engineering Education (ASEE) Conference and Exposition*, Seattle, WA, June 2015, online.
- C15 Kuder, K.***, Gnanapragasam, N., Smith-Pardo, J. "Experiential Learning Through Structural Retrofit Projects," 2014 Capstone Design Conference, June 2014, online.
- C14 de Vera, W.**, **Mellies, J.**, **Miyahara, R.**, **Pickering, D.**, **Kuder, K.**, Cochran, R. "The Cedar Falls Dam Guardrail, Handrail, and Vehicle Barrier Retrofit," *Dam Safety 2011, 28th Annual Conference of the Association of State Dam Safety Officials*, September 2011, on disk. (no presentation given)
- C13 Kuder, K.*** and Gnanapragasam, N. "Implementing Peer Review Process in Civil Engineering Laboratories," *2011 Annual American Society for Engineering Education (ASEE) Conference and Exposition*, Vancouver, B.C., June 2011, on disk.
- C12 Kuder, K.***, **Wells, K.**, Shogren, R. "Low Portland Cement-Content SCC Mix Design for Use in Structural Applications," *Second International Conference on Sustainable Construction Materials and Technologies*, Ancona, Italy, June 2010, pp 1263-1270.
- C11 Kuder, K.***, Tinnea, J., Tinnea, R., **Bellomio, S.**, **Fanoni, M.**, **Johnson, D.**, **Towns, J.** "High Early Strength, High Resistivity Concrete Mix Design Using Supplementary Cementitious Materials," *Second International Conference on Sustainable Construction Materials and Technologies*, Ancona, Italy, June 2010, pp 843-851.
- C10 Tregger, N.***, Ferron, R., Beacraft, M., Kim, J., **Kuder, K.**, Shah, S. "Improvement of Fresh-State Concrete Through Small Additions of Clay," *ACI Committee 236 Special Publication: Advances in the Material Science of Concrete*, SP-270-05, 2010, on disk.
- C9 Tinnea, R.***, Tinnea, J., **Kuder, K.**, Daudistel, R., Hassane, B., Stoll, C., Tomosada, K.A. "Testing of High-Resistivity Concrete." *National Association of Corrosion Engineers (NACE) Corrosion 2009 Conference and Exposition*, Atlanta, GA, March 2009, on disk.
- C8 Kuder, K.G.** and Shah, S.P.* "Importance of Processing in Advanced Cement-Based Products," *ACI Committee 549 Special Publication: Fabrication Technologies for Thin Cementitious Products*, SP-260-1, 2009, on disk.
- C7 Kuder, K.G.** and Shah, S.P.* "Nailable Extruded HPFRCC for Use in Residential Building Applications." *ACI Committee 549 Special Publication: Fabrication Technologies for Thin Cementitious Products*, SP-260-3, 2009, on disk.
- C6 Kuder, K.G.***, Gupta, R., Harris-Jones, C., Hawksworth, R., Henderson, S. and Whitney, J. "Mechanical Properties of Concrete Encased in PVC Stay-in-Place Formwork." *International Conference on Excellence in Concrete Construction – Through Innovation*. London, England, September 2008, pp. 63-72.
- C5 Gnanapragasam, N.**, **Kuder, K.*** and Dragovich, J. "Comparison between Grade Earned in a Course and Performance in a Simulated FE examination for Mechanics Related

Courses," *2008 Annual ASEE Conference and Exposition*, Pittsburgh, PA, June 2008, on disk.

- C4 Kuder, K.G.** and Shah, S.P.* "Processing of High-Performance Fiber-Reinforced Cement-Based Composites." *10th International Inorganic-Bonded Fiber Composites Conference*, Sao Paulo, Brazil, November 2006, on disk.
- C3 Kuder, K.G.***, Shah, S.P. and Mu, E.B. "Nailing Ability (Nailability) of High Performance Fiber-Reinforced Cementitious Composites." *CONMAT '05: The Third International Conference on Construction Materials: Performance, Innovations and Structural Implications*. Special Session: "Protecting Structures Against Blast and Impact." Vancouver, B.C., August 2005, on disk.
- C2** Shah, S.P.* , **Kuder, K.G.** and Mu, B. "Fiber-Reinforced Cement-Based Composites: A Forty Year Odyssey." *Sixth RILEM Symposium on Fibre Reinforced Concretes (BEFIB 2004)*, Varenna-Lecco, Italy, September 2004, pp. 3-30.
- C1 Kuder, K.G.*** and Shah, S.P. "Freeze-Thaw Durability of Commercial Fiber-Reinforced Cement Board." *ACI Committee 549 Special Publication: High-Performance Fiber-Reinforced Concrete Thin Sheet Products*, Vancouver, B.C., March 2003, pp. 145-160.

Non-Refereed Conference Publications (*indicates presenter at conference)

- N12 Kuder, K.***, Lehman, D., Chen, J., Lowes, L, Roeder, C. "Creep of Sustainable Concrete Filled Tubes," *2015 Structural Engineers Association of Oregon (SEAOC) Convention*, September 2015.
- N11 Kuder, K.***, Lehman, D., Hannesson, G. Shogren, R., Berman, J. and Roeder, C. "High Volume Cement Replacement in Ternary SCC Mixes for Composite Construction," *National Ready-Mixed Concrete Association 2012 International Concrete Sustainability Conference*, Seattle, USA, May 2012, online.
- N10** Gupta, R. and **Kuder, K.** "Formwork, Insulation, Wall thickness and Fly Ash: Do They Affect Concrete Maturity?," *Modern Formwork Systems for Building Construction*, Madras, Chennai, March 2012. (no presentation given)
- Reprinted: *The Masterbuilder*, April 2013, pp 74-86.
- N9** Lehman, D.* , Hannesson, G., Berman, J., Roeder, C., **Kuder, K.** and Shogren R. "SCM-Rich Concrete in Composite Construction," *2010 Structural Engineers Association of California (SEAOC)*, September 2010, on disk.
- N8 Kuder, K.G.** and Gnanapragasam, N.* "Undergraduate Research Opportunities in Senior Design." *National Capstone Design Course Conference*, Boulder, CO, June 2007, on disk.
- N7 Kuder, K.G.**, Ozyurt, N., Mu, E.B. and Shah, S.P.*. "Rheology of Fiber-Reinforced Cement Systems Using a Custom-Built Rheometer." *Symposium on Brittle Matrix Composites 8*, Warsaw, Poland, October 2006. pp 431-9.
- N6 Kuder, K.G.*** and Shah, S.P. "Capillary Rheology of Extruded Cement-Based Materials." *16th European Conference of Fracture: Measuring, Monitoring and Modeling Concrete Properties: In Honor of Surendra P. Shah. Designing Concrete for Unconventional Properties – Fresh State Concrete Properties*, Alexandroupolis, Greece, July 2006. pp 479-484.

- N5** **Kuder, K.G.*** and Shah, S.P. "Extruded HPFRCC for Residential Applications." *Workshop on Advances in the Science and Engineering of Thin Reinforced Cement-Based Composites*, Bangkok, Thailand, February 2006, pp. 609-620.
- N4** Shah, S.P. and **Kuder, K.G.*** "Hybrid and High-Performance Fiber-Reinforced Cementitious Composites." *Fiber Reinforced Concrete From Theory to Practice*, Bergamo, Italy, September 2004, pp. 83-92.
- N3** **Kuder, K.G.***, Ozyurt, N., Mu, B. and Shah, S.P. "The Rheology of Fiber-Reinforced Cement Paste Evaluated by a Parallel Plate Rheometer." *International Symposium: Advances in Concrete through Science and Engineering (RILEM)*, Evanston, IL, March 2004. On disk.
- N2** **Kuder, K.G.***, Mu, B., Cyr, M.F. and Shah, S.P. "Extruded Fiber-Reinforced Composites for Building Enclosures." *NSF Housing Research Agenda Workshop: Proceedings and Recommendations*, Orlando, FL, February 2004, pp. 222-231.
- N1** Wierman-**Kuder, K.G.*** and Shah, S.P. "The Effects of Pressure on the Freeze-Thaw Durability of Fiber-Reinforced Cement Board." *8th Inorganic-Bonded Wood and Fiber Composite Materials Conference*, e.d. Al Moslemi, Sun Valley, ID, September 2002, pp. 192-205.

Presentations

- P4** Lehman, D.*, Kuder, K. Berman, J., Roeder, C., Gunnarson, A. "High Volume SCM Composite Structural Systems," *National Ready-Mixed Concrete Association 2012 International Concrete Sustainability Conference*, May 2012, on line.
- P3** **Kuder, K.G.***, Wells, K., Shogren, R., Hannesson, G., Berman, J., Lehman, D., Roeder, C. "Low Portland Cement SCC for Composite Construction," NSF Workshop *Green Sustainable Buildings in Desert Environments*, Cairo, Egypt, Spring 2010.
- P2** **Kuder, K.G.***, Rapoport, J. and Shah, S.P. "Cellulose Fibers in Cast, Hatschek-produced and Extruded Composites." ACI Session *Natural Fiber Cement Composites*, Atlanta, GA, Spring 2007.
- P1** **Kuder, K.G.***, Gupta, R., Harris-Jones, C., Hawksworth, R., Henderson, S. and Whitney, J. "Effect of PVC Stay-in-Place Formwork on the Mechanical Performance of the Concrete that it Encases." Poster presentation at *Seattle University Celebration of Faculty Scholarship and Research*, Spring 2007.

Reports

- R1** Gunnarsson, A.K., Lehman, D., Roeder, C. and **Kuder, K.**, "Long-Term and Seismic Performance of Concrete-Filled Steel Tube Columns with Conventional and High-Volume SCM Concrete," *Transportation Northwest (TransNOW)*, Final Report TNW2012-18, June 2012.

Teaching

Courses

- T1** CEEGR 1000 – Introduction to Civil Engineering (Fall 2015-2016)
- T2** CEEGR 2210 – Mechanics of Materials I (Fall 2005, Spring 2006, Fall 2006, Spring 2010 – two sections)

- T3** CEEGR 2220 – Mechanics of Materials Laboratory I (Fall 2005-2006, 2008-2010, 2017, Spring 2006-2011 – two sections)
- T4** CEEGR 3230 – Mechanics of Materials II (Winter 2006-2008, 2010-2013, 2015, 2017)
- T5** CEEGR 3240 – Mechanics of Materials Laboratory II (Winter 2006-2008, 2010 – two sections)
- T6** CEEGR 3250 – Applied Engineering Mechanics, Cross-listed with CEEGR 323 (Winter 2006-2008)
- T7** CEEGR 4450 – Structural Engineering Mechanics (Fall 2008, 2010, 2011, 2013)
- T8** CEEGR 4490 – Structural Design II, Reinforced Concrete (Spring 2007)
- T9** CEEGR 4490 – Structural Design II, Steel Design (Spring 2008, 2011-2018)
- T10** CEEGR 4870 – Engineering Design I, coordinator (Fall 2008)
- T11** CEEGR 5110 – Advanced Structural Analysis (Fall 2015-2018)
- T12** SCENG 1000 – Introduction to Engineering, co-teacher (Fall 2013), coordinator (Fall 2014)

Senior Design Projects

- SR9** CEE 14.3, “Canal Substation Control Building Seismic Evaluation.” (fall 2013)
- SR8** CEE 13.3, “Bothell Substation Control Building Seismic Assessment.” Sponsored by Seattle City Light. (2012-2013)
- SR7** CEE 12.2, “Newhalem Sickler Building – Structural Upgrade.” Sponsored by Seattle City Light. (2011-2012)
- SR6** CEE 11.2, “Cedar Falls Dam Guardrail, Handrail and Vehicle Barrier Retrofit.” Sponsored by Seattle City Light. (2010-2011)
- SR5** CEE 10.1, “Boundary Dam Sluice Gate Walkway Reconstruction.” Sponsored by Seattle City Light. (2009-2010).
- SR4** CEE 09.3, “High Early Strength, High Resistivity Concrete Mix Design.” Sponsored by Seattle Public Utilities, Liaison - Tinnea and Associates. (2008-2009).
- SR3** CEE 08.5, “Very High Early Strength, High Resistivity Concrete Mix Design.” Sponsored by Seattle Public Utilities, Liaison - Tinnea and Associates. (2007-2008).
- SR2** CEE 07.3, “Effect of PVC Stay-in-Place Formwork on the Hydration of Concrete.” Sponsored by Octaform Systems, Inc. Liaison – Rishi Gupta. (2006-2007).
- SR1** CEE 06.4, “Effect of PVC Stay-in-Place Formwork on the Mechanical Performance of Concrete.” Sponsored by Octaform Systems, Inc, Liaison – Rishi Gupta. (2005-2006).

Service

University and College

- S19** College of Science and Engineering Chair Stipend Committee, fall 2017.
- S18** College of Science and Engineering Ad Hoc Annual Faculty Performance Review Committee, 2014-2016.
- S17** College of Science and Engineering Personnel Committee, 2013-present. Chair fall 2015-present.
- S16** College of Science and Engineering Facilities Planning Committee, 2010.
- S15** Seattle University Advising Workgroup, Winter 2010.
- S14** College of Science and Engineering Curriculum Committee, Fall 2008-2010, Spring 2012.
- S13** College of Science and Engineering Faculty Development Committee, Fall 2006-2009.
- S12** Seattle University Undergraduate Student Research Task Force, 2007.
- S11** Seattle University Sponsored Research Office Policies and Procedures Committee, Summer 2007.

Departmental

- S10** ASCE Club Faculty Advisor, 2011-present.
- S9** Structural Engineers Association of Washington (SEAW) Faculty Liaison, 2009-present.
- S8** ACI Seattle Local Chapter Liaison, 2005-present.
- S7** National Council of Examiners for Engineering and Surveying (NCEES) Engineering Award for senior design project primary author for successful \$7,500 award:
 - “Seismic Analysis and Retrofit Design of a Historic Substation Control Building,” 2015.
 - “Historic Landmark Incline Lift Structural Evaluation and Retrofit,” 2014.
 - “Structural Evaluation and Retrofit of a Warehouse,” 2013.
 - “Structural Historic Dam Guard Rail and Vehicle Barrier Retrofit for Public Safety,” 2012.
 - “Structural Design of Dam Sluice Gate Walkway Slabs: Retrofit and Replacement Options,” 2011.
- S6** Civil and Environmental Engineering Faculty Search Committee: Water Resources and Fluid Mechanics, 2006; Structural/Mechanics, 2010; Environmental Science, 2014; General Civil Engineering, 2015; Structural/Mechanics, 2015; Structural/Mechanics, 2016; Structural/Mechanics, 2017.

Scholarly

- S5** **Journal Reviewer:** *ACI Materials Journal*, *ASCE Journal of Materials in Civil Engineering*, *ASCE Journal of Structural Engineering*, *Composites: Part A: Applied Science and Manufacturing*, *Concrete and Computers*, *Construction and Building Materials*,

Experimental Techniques, International Journal of Impact Engineering, International Journal of Concrete Structures and Materials, Materials and Structures, Resources, Conservation and Recycling, 2005-present.

- S4 Grant Reviewer:** *U.S.-Israel Binational Science Foundation (BSF), National Science Foundation (NSF) Infrastructure Materials and Structural Mechanics Division, NSF Research Experience for Students (IRES) Program, The University of Wisconsin System Solid Waste Program, 2007-present.*
- S3 Conference Proceeding Reviewer:** *ACI Special Publications, 2014 Capstone Design Conference, CONMAT '05: The Third International Conference on Construction Materials: Performance, Innovations and Structural Implications, 2005-present.*
- S2 Committee member,** *ACI Committee 544 Fiber-Reinforced Concrete, 2005 – 2011.* Also authored part of a chapter for the *ACI 544 State-of-the-art Durability Report on Rheology.* The document has been approved for publication by the committee.
- S1 Committee member,** *ACI Committee 549 Thin Fiber-Reinforced Cementitious Products and Ferrocement, 2005 – 2015.*

Funding

- F8** Seattle University Summer Faculty Fellowship, “Sustainable, Extruded High Performance Fiber Reinforced Cementitious Composites,” \$7,000, 2016.
- F7** Seattle University Thomas Bannan Chair of Engineering and Computer Science, \$40,000, 2013-2015.
- F6** Seattle University Summer Faculty Fellowship, “Green Concrete for Composite Construction: High Volume Cement Replacement with Supplementary Cementitious Materials,” \$7,000, 2012.
- F5** National Science Foundation (NSF) Major Research Instrumentation (MRI) Grant, “Acquisition of a raman and laser-induced breakdown spectroscopy (LIBS) microscope for interdisciplinary research and research training at Seattle University,” \$265,908, 2012-2015. Principal Investigator, Ryan McLaughlin, Co-PIs: Shih, F., Lauer, J.W., Kuder, K., Stipe, C.
- F4** Transportation Northwest (TransNOW) Grant, “An Environmentally-Conscious Structural System to Achieve ABC in High Seismic Zones,” \$107,000 (two awards to support graduate students), 2009-2010. Principal Investigator, Lehman, D.; Co-PI, Kuder, K.
- F3** National Science Foundation (NSF) Major Research Instrumentation (MRI) Grant, “Acquisition of a 400 MHz NMR spectrometer for research and research training at Seattle University,” \$368,401, 2006-2009. Principal Investigator, Alaimo, P.J.; Co-PIs: Langenhan, J, McLaughlin, R., Meany, J., Smith, D., Kuder, K.
- F2** Seattle University Summer Faculty Fellowship, “Constitutive Modeling of PVC-Encased Concrete,” \$6,516, 2006.
- F1** College of Science and Engineering Bannan equipment funds, “Concrete Lab Equipment for Research, Teaching and Senior Design Projects,” \$5,000, 2006.

Professional Associations

- Alpha Sigma Nu, Jesuit honors society, inducted 1998

- American Concrete Institute (ACI), member since 2001
- American Institute of Steel Construction (AISC), member since 2008
- American Society for Engineering Education (ASEE), member since 2005
- American Society of Civil Engineers (ASCE), member since 1998
- Structural Engineers Association of Washington (SEAW), member since 2010
- Tau Beta Pi, Engineering honors society, inducted 1998

Awards and Honors

- Thomas Bannan Chair of Engineering and Computer Science, 2013-2015
- Illinois Ready Mixed Concrete Association Scholarship, 2004
- American Concrete Institute Student Fellowship, 2002-2003
- Northwestern University Walter P. Murphy Fellowship, 2000-2002