David Joseph Corr, Ph.D., P.E.

Contact Information

Civil & Environmental Engineering
Northwestern University
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Education

University of Notre Dame	B.S. Civil Engineering	1996
University of California, Berkeley	M.S. Civil Engineering	1998
University of California, Berkeley	Ph.D. Civil Engineering	2001

Appointments

1/2018 to present:	Clinical Professor, Civil and Environmental Engineering, Northwestern University Director of Graduate Studies, Civil and Environmental Engineering, 9/2012 – present
9/2014 to 9/2015:	Charles Deering McCormick University Distinguished Clinical Professor, 9/2014-9/2015
9/2008 to 12/2017:	Clinical Associate Professor, Civil and Environmental Engineering, Northwestern University Joint Appointment with Infrastructure Technology Institute, 9/2008 – 8/2013
4/2007 to 8/2008:	Senior Engineer, Exponent, Inc.
1/2006 to 4/2007:	Engineer, Exponent, Inc.
8/2003 to 12/2005:	Research Assistant Professor, Civil and Environmental Engineering, Northwestern University
3/2003 to 8/2003:	Postdoctoral Research Associate, Center for Advanced Cement Based Materials, Northwestern University
9/2001 to 2/2003:	Postdoctoral Fellow, Civil Engineering, Johns Hopkins University
5/1998 to 8/1998:	Structural Engineering Intern, Weidlinger Associates, Inc.
8/1997 to 5/2001:	Graduate Student Researcher and Instructor, University of California, Berkeley

Publications

Archival Journal Articles

38. Mete F, Kosnik DE and Corr DJ (2018), "Long-term monitoring of bridge performance using structural health monitoring and weigh-in-motion data", *in preparation*.

37. Mete F, Corr DJ, Wilbur M and Chen Y (2018), "Bridge response and heavy truck classification using multistep machine learning", *in preparation*.

36. Mete F, Chen Y, Stathopoulos A and Corr DJ (2018), "A comparative study of predictive analysis methods to estimate bridge response," *Transportation Research Record*, under review.

35. Gao Y, Corr DJ, Konsta-Gdoutos MS, Shah SP (2018), "Effect of carbon nanofibers on autogenous shrinkage and shrinkage cracking of cementitious nanocomposites," *ACI Materials Journal* 115(4).

34. Zhu X, Gao Y, Dai Z, Corr DJ and Shah SP (2017), "Effect of interfacial transition zone on the Young's modulus of carbon nanofiber reinforced cementitious composites," *Cement and Concrete Research* 107.

33. Kong D, Huang S, Corr DJ, Yang Y and Shah SP (2017), "Whether nano-particles act as nucleation sites for C-S-H gel growth during cement hydration," *Cement and Concrete Composites* 87.

32. Ouyang J, Tan Y, Corr DJ and Shah SP (2017), "Viscosity prediction of fresh cement asphalt emulsion pastes," *Materials and Structures* 50:59.

31. Xu J, Corr DJ and Shah SP (2017), "Nanoscratch Study of the Modification Effects of Nano-SiO2 on C-S-H Gel/Cement Grain Interfaces," *Journal of Materials in Civil Engineering* 29(9).

30. Ouyang J, Tan Y, Corr DJ and Shah SP (2016), "Investigation on the mixing stability of asphalt emulsion with cement through viscosity," *Journal of Materials in Civil Engineering* 28(12).

29. Ouyang J, Corr DJ and Shah SP (2016), "Factors influencing the rheology of fresh cement asphalt emulsion paste," *Journal of Materials in Civil Engineering* 28(11).

28. Ouyang J, Tan Y, Corr DJ and Shah SP (2016), "The thixotropic behavior of fresh cement-asphalt emulsion paste", *Construction and Building Materials* 114, pp. 906-912.

27. Li W, Kawashima S, Xiao J, Corr DJ, Shi C and Shah SP (2015), "Comparative investigation on nanomechanical properties of hardened cement paste", *Materials and Structures* 49(5), pp. 1591-1604.

26. Kong D, Corr DJ, Hou P, Yang Y and Shah SP (2015), "Influence of colloidal silica sol on fresh properties of cement paste", *Cement and Concrete Composites* 63, pp. 30-41.

25. Xu J, Corr DJ and Shah SP (2015), "Nanomechanical investigation of the effects of nanoSiO_2 on CSH gel/cement grain interfaces", *Cement and Concrete Composites* 61, pp. 7-17.

24. Xie Y, Corr DJ, Jin F, Zhou H and Shah SP (2015), "Experimental study of the interfacial transition zone of rock-filled concrete (RFC)", *Cement and Concrete Composites* 55, pp. 223-231.

23. Chen Y, Corr DJ, and Durango-Cohen PL (2014), "Analysis of common-cause and special-cause variation in the deterioration of transportation infrastructure: A field application of statistical process control for structural health monitoring", *Transportation Research Part B: Methodological* 59(1), pp. 96-116.

22. Xie Y, Corr DJ, Chaouche M, Jin F and Shah SP (2014), "Experimental study of filling capacity of self-compacting concrete and its influence on the properties of rock-filled concrete", *Cement and Concrete Research* 56(2), pp. 121-128.

21. Kawashima S, Chaouche M, Corr DJ and Shah SP (2014), "Influence of purified attapulgite clays on the adhesive properties of cement pastes as measured by the tack test," *Cement and Concrete Composites* 48, pp. 35-41.

20. Kawashima S, Seo JWT, Corr D, Hersam MC and Shah SP (2014), "Dispersion of CaCO3 nanoparticles by sonication and surfactant treatment for application in fly ash-cement systems," *Materials and Structures* 47(6), pp. 1011-1023.

19. Kawashima S, Chaouche M, Corr DJ and Shah SP (2013), "Rate of thixotropic rebuilding of cement pastes modified with highly purified attapulgite clays", *Cement and Concrete Research* 53(11), pp. 112-118.

18. Xiao J, Li W, Corr DJ and Shah SP (2013), "Effects of interfacial transition zones on the stress-strain behavior of modeled recycled aggregate concrete," *Cement and Concrete Research* 52(10), pp. 82-99.

17. Xiao J, Li W, Corr DJ and Shah SP (2013), "Simulation Study on the Stress Distribution in Modeled Recycled Aggregate Concrete under Uniaxial Compression," *Journal of Materials in Civil Engineering*

25(4), pp. 504-518.

16. Hou P, Kong D, Kawashima S, Qian J, Corr DJ and Shah SP (2013), "A novel evidence for the formation of semi-permeable membrane surrounding the Portland cement particles during the induction period," *Journal of Thermal Analysis and Calorimetry* 113(2), pp. 881-884.

15. Hou P, Kawashima S, Wang K, Corr DJ, Qian J and Shah SP (2013), "Effects of colloidal nanosilica on rheological and mechanical properties of fly ash-cement mortar," *Cement and Concrete Composites* 35(1), pp. 12-22.

14. Hou, P, Kawashima S, Kong D, Corr DJ, Qian J and Shah SP (2013), "Modification effects of colloidal nanoSiO_2 on cement hydration and its gel properties," *Composites Part B: Engineering* 45(1), pp. 440-448.

13. Kawashima S, Hou P, Corr DJ and Shah SP (2013), "Modification of cement-based materials with nanoparticles," *Cement and Concrete Composites* 36(1) pp. 8-15.

12. Kawashima S, Kim JH, Corr DJ and Shah SP (2012), "Study of the mechanisms underlying the fresh-state response of cementitious materials modified with nanoclays," *Construction and Building Materials* 36, pp. 749-757.

11. Kosnik DE, Hopwood II T, Kotowsky MP, Corr DJ and Marron DR (2010), "Continuous Remote Monitoring of Structural Health for Life Extension of Uplift Bearing Assembly on Large Cantilever Truss Bridge," *Transportation Research Record* 2201, pp. 139-147.

10. Tregger N, Corr DJ, Graham-Brady LL, Shah SP (2007), "Modeling mesoscale uncertainty for concrete in tension," *Computers and Concrete,* **4**(5), pp 347-362.

9. Tregger N, Corr DJ, Graham-Brady LL, Shah SP (2006), "Multi-scale Mechanics Method for Analysis of Random Concrete Microstructure," *Probabilistic Engineering Mechanics,* 21(3), pp 217-225.

8. Graham-Brady LL, Arwade SR, Corr DJ, Guitierrez M, Breysee D, Grigoriu M, Zabaras N (2006), "Probability and Materials, from Nano- to Macro-Scale, a Summary," *Probabilistic Engineering Mechanics,* 21(3), pp 193-199.

7. Corr DJ, Accardi M, Graham-Brady LL, Shah SP (2005), "Digital Image Correlation Analysis of Interfacial Debonding Properties and Fracture Behavior in Concrete" *Engineering Fracture Mechanics,* 74(1-2), pp 109-121.

6. Corr DJ, Juenger MCG, Monteiro PJM, Bastacky J (2004), "Investigating Entrained Air Voids and Portland Cement Hydration with Low-Temperature Scanning Electron Microscopy," *Cement and Concrete Composites,* 26(8), pp 1007-1012.

5. Corr DJ and Graham LL (2003), "Mechanical Analysis with Moving-Window Generalized Method of Cells," *ACI Materials Journal,* 100(2), pp 156-164.

4. Corr DJ, Monteiro PJM, Bastacky J (2003), "Observations of Ice Lens Formation and Frost Heave in Young Portland Cement Paste," *Cement and Concrete Research,* 33(10), pp 1531-1537.

3. Corr DJ, Monteiro PJM, Bastacky J (2002), "Microscopic Characterization of Ice Morphology in Entrained Air Voids." *ACI Materials Journal,* 99(2) pp 190-195.

2. Corr DJ, Lebourgeois J, Monteiro PJM, Bastacky J, Gartner EM (2002), "Air Void Morphology in Fresh Pastes," *Cement and Concrete Research,* 32(7) pp 1025-1031.

1. Corr DJ, Monteiro PJM, Kurtis KE, Der Kiureghian A (2001), "Sulfate Attack of Concrete: Reliability Analysis," *ACI Materials Journal,* 98(2) pp 99-104.

Conference Proceedings

7. Kosnik DE, Hopwood T and Corr DJ (2011), "Acoustic Emission Monitoring for Assessment of Steel Bridge Details, *American Institute of Physics*, July 2010, San Diego, CA.

6. Corr D, McCann D and McDonald B (2008), "Lessons Learned from March Bridge Collapse," *ASCE 5th Congress on Forensic Engineering*, November 2009, Washington, DC.

5. Landis E and Corr DJ (2006), "Three Dimensional Analysis of Air Void Systems in Concrete," *16th European Conference of Fracture*, 2006, pp. 517-524.

4. Corr DJ and Shah SP (2005), "Concrete Materials Science at the Nanoscale," Keynote Paper, *Global Construction: Ultimate Concrete Opportunities*, July 5-7, 2005, Scotland.

3. Corr DJ and Graham-Brady LL (2003), "Simulation of Random Material Properties and Local Maximum Stresses and Strains in Concrete," *Proceedings, 9th International Conference on Applications of Statistics and Probability in Civil Engineering*, Millpress, Rotterdam.

2. Corr DJ, Graham-Brady LL, Igusa T, Der Kiureghian A (2003), "Reliability of Service Life Predictions for Concrete under Sulfate Attack," *Proceedings, 9th International Conference on Applications of Statistics and Probability in Civil Engineering*, Millpress, Rotterdam.

1. Corr DJ and Graham LL (2002), "Micromechanical Analysis of Concrete with Random Microstructure," *Proceedings, 15th ASCE Engineering Mechanics Conference*, June 2-5, 2002, Columbia University, New York.

Teaching Activities (all at Northwestern University, through the Department of Civil and Environmental Engineering):

CIV_ENV 220 – Structural Art. Course focusing on the history of structural engineering as a creative art, examining the scientific, social, and symbolic impacts of iconic structures. Taught 3 times, most recently Spring 2018.

CIV_ENV 320 – Structural Analysis – Dynamics. Upper-division course in dynamics of structures and earthquake ngineering. Taught eight times, most recently Fall 2017.

CIV_ENV 325 - Reinforced Concrete Design. Upper-division course in analysis and design of concrete structures. Taught eight times, most recently Winter 2018.

CIV_ENV 222 - Structural Steel Design. Upper-division course in analysis and design of steel structures. Taught Winter 2009, Spring 2010.

CIV_ENV 382 - Capstone Design. Culminating course, providing a realistic design experience for graduating seniors in civil engineering and environmental engineering programs. Taught nine times, most recently Spring 2018.

CIV_ENV 395 - Engineering Forensics. Upper-division course in the principles and practice of forensic engineering. Taught four times, most recently Fall 2013.

CIV_ENV 221 - Theory of Structures I. Upper-division course in the principles of structural analysis. Taught Fall 2004, Fall 2005, Fall 2011.

CIV_ENV 195 – Introduction to Civil and Environmental Engineering. Freshman seminar course introducing the field of civil and environmental engineering. Taught six times, most recently Fall 2018.

GEN_ENG 205-2 - Engineering Analysis 2. Freshmen course in engineering statics and dynamics. Taught five times, 2004-2009.

Invited Presentations – Recent Activity (presenter indicated with *)

David J. Corr*. *Building supertall with super small: nanomodification for 21st century structural conocrete*, Civil and Environmental Engineering Seminar, University of Michigan, May 2017.

David J. Corr*. *Concrete and the Supertalls: is Nanomodification the key to structural concrete for this century?*, Materials Group Seminar, Georgia Institute of Technology, June 2016.

David J. Corr*. *Concrete and the Supertalls: is Nanomodification the key to structural concrete for this century?*, Materials Seminar, Department of Civil and Environmental Engineering, University of Illinois at Urbana-Champaign, April 2016.

David. J. Corr, Dennis M. McCann*, and B. McDonald. *Lessons Learned from the Marcy Bridge Collapse*. ASCE Congress on Forensic Engineering, November 2009, Washington DC.

David. J. Corr*, Dennis McCann, Vijay Saraf, and Brian McDonald. *Lessons Learned from the Marcy Bridge Collapse*. Midwest Bridge Working Group, December 10, 2008, Louisville, Kentucky.

David. J. Corr*, *Structural Engineering: Practice and Education*. Department of Civil and Environmental Engineering, Northwestern University, April 23, 2008.

Externally Funded Research Grants – Recent Activity

ACI Foundation, "Structural nanomodified concrete: an investigation of critical properties," $50,000, September 2018-December 2019.

ACI Foundation, "High Corrosion Resistant Reinforced Concrete (CRRC) modified by nano and micro scale carbon and steel fiber network," $50,000, under review.

Cemex Resarch Group AG, "Functionalization and Property Measurement of Carbon Nanotube reinforced cementitious composites," $110,000, January 2015-January 2016.

Students Advised

PhD adviser and co-adviser to: Raul Marrero (current), Kavya Mendu (current), Yuan Gao (2018), Fiorella Mete (2018), Shiho Kawashima (2013, co-advised with Shah)

Ph.D. committees: Lin Wan (2015), David Kosnik (2013), Yikai Chen (2013), Nathan Tregger (2009)

M.S. thesis advisers to: Chuanjiao Hu (2015), Hanxiao Sun (2015), Tobi Barabinde (2015, co-advised with Cusatis), David Kosnik (2009, co-advised with Dowding), Mat Kotowsky (2010, co advised with Dowding)

Awards and Professional Activities

Charles Deering McCormick University Distinguished Clinical Professor, Northwestern University. Awarded 2014.

Certificate of Teaching Excellence, McCormick School of Engineering and Applied Science. Awarded 2011.

Northwestern University Faculty Senate, representative of McCormick non-tenure track faculty, 2016-2018.

Illinois Licensed Professional Engineer #62059436

American Concrete Institute (ACI), member

American Ceramic Society (ACerS), member and President of Cements Division, 2018-2019.

7th Advances in Cement-Based Materials, July 2016 ACerS Cements Division conference, Program Chair