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Associate Professor of Structural Engineering

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## Professional Preparation and Licenses

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Licensed Professional Engineer in Civil Engineering	CA C63734(9/16) & PA PE077165(9/15)
The University of California Berkeley	Civil Engineering Ph.D., 2000
The University of California Berkeley	Civil Engineering M.S., 1994
The University of Hawaii Manoa	Civil Engineering B.S., 1993

## Appointments

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2011 – Present:	Associate Chair, Lehigh University, Department of Civil and Environmental Engineering
2007 – Present:	Associate Professor, Lehigh University, Department of Civil and Environmental Engineering
2007 – 2009:	Visiting Professor, Air Force Research Laboratory, Tyndall AFB, Florida
2006 – 2007:	P.C. Rossin Assistant Professor, Lehigh University, Dept. of Civil and Env. Engineering
2002 – 2007:	Assistant Professor, Lehigh University, Department of Civil and Environmental Engineering
2000 – 2001:	Postdoctoral Researcher, University of California, Berkeley
1994 – 1999:	Graduate Student Researcher, University of California, Berkeley
1998 Summer:	Visiting Researcher, PWRI, Earthquake Disaster Prevention Center, Tsukuba, Japan
1995 – 1996:	Structural Engineering Consultant, Sonic Force, Engineering Department, Milbrae, CA
1992 – 1993:	Structural Engineer, Hawaiian Electric Co., Structural Engineering Department
1991 – 1992:	Engineering QA/QC, M. Sonomura Contracting Co., Inc. Hilo, Hawaii

## Books and Manuals

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1. Oswald, C., **Naito, C.**, “Precast Prestressed Concrete Blast-Resistant Design Manual,” Precast/Prestressed Concrete Institute, MNL-141-12, October 2012, 131 pages, ISBN 978-0-9797042-0-8. (1<sup>st</sup> Edition)

## Refereed Journal Publications

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(Underline = Student on research effort, Underline\* = Student under direct supervision of C. Naito)

1. Wan, G., Zhang, D., Fleischman, R. B., **Naito, C.**, “A Coupled Connector Element for Nonlinear Static Pushover Analysis of Precast Concrete Diaphragms,” Elsevier Journal of Engineering Structures, Vol. 86, No.1, Mar. 2105 (Accepted Dec. 2014), pp.58-71. DOI: 10.1016/j.engstruct.2014.12.029.
2. Piran Aghl, P.\*, **Naito, C.**, Riggs, H., “Estimation of Demands Resulting from Inelastic Axial Impact of Steel Debris,” Elsevier Journal of Engineering Structures, Vol. 82, No.1, pp.11-21, Jan. 2015, DOI: 10.1016/j.engstruct.2014.10.021.
3. Riggs, H., Cox, D., **Naito, C.**, Kobayashi, M., Piran Aghl, P.\*, Ko, H., Khowitar, E., “Experimental and Analytical Study of Water-Driven Debris Impact Forces on Structures,” ASME Journal of Offshore Mechanics and Arctic Engineering, Vol. 136, No.4, November 2014, DOI:10.1115/1.4028338.
4. **Naito, C.**, Olmati, P.\*, Trasborg, P.\*, Davidson, J., Newberry, C., “Assessment of Insulated Concrete Walls to Close-In Blast Demands,” ASCE Journal of Performance of Constructed Facilities, Accepted June 2014, DOI: 10.1061/(ASCE)CF.1943-5509.0000643, Published Online: September 17, 2014.
5. **Naito, C.**, Beacraft, M.\*, Salim, H., Hoemann, J., Shull, J., Bewick, B., “Blast Performance of Single Span Precast Concrete Sandwich Wall Panels,” ASCE Journal of Structural Engineering, DOI: 10.1061/(ASCE)ST.1943-541X.0001020, Published Online: June 2014.

6. Piran Aghl, P.\*, **Naito, C.**, Riggs, H.R., "Full-Scale Experimental Study of Impact Demands Resulting From High Mass, Low Velocity Debris," ASCE Journal of Structural Engineering, Vol. 140, No.5, May 2014, DOI: 10.1061/(ASCE)ST.1943-541X.0000948, Published Online: February, 2014.
7. **Naito, C.**, States, J.\*, Jackson, C., Bewick, B., "Assessment of Crumb Rubber Concrete for Flexural Structural Members," ASCE Journal of Materials in Civil Engineering, Vol. 26, No. 10, Published Online: November 2013, In-Print October 2014, DOI: 10.1061/(ASCE)MT.1943-5533.0000986.
8. **Naito, C.**, States, J.\*, Jackson, C., Bewick, B., "Crumb Rubber Concrete Performance Under Near Field Blast and Ballistic Demands," ASCE Journal of Materials in Civil Engineering, Vol. 26, No. 9, Published Online: October 2013, In-Print September 2014, DOI: 10.1061/(ASCE)MT.1943-5533.0000957.
9. Jordan, J.\*, **Naito, C.**, Haquee, B. Z., "Progressive Damage Modeling of Plain Weave E-Glass/Phenolic Composites," Elsevier Journal of Composites: Part B, Vol. 61, pp. 315-323, Published Online January 2014, In Print May 2014, DOI: 10.1016/j.compositesb.2014.01.037.
10. **Naito, C.**, Cercone, C.\*, Riggs, H.R., Cox, D., "Procedure for Site Assessment of the Potential for Tsunami Debris Impact," ASCE Journal of Waterway, Port, Coastal, and Ocean Engineering, Vol. 140, No. 2, pp.223–232, March 2014. DOI: 10.1061/(ASCE)WW.1943-5460.0000222.
11. **Naito, C.**, Oswald, C., PCI BRSI Committee, "Appendix A: Blast-Resistant Design of Precast, Prestressed Concrete Components," Journal of the Precast/Prestressed Concrete Institute, Vol. 59, No.1, Winter 2014, pp.137-159.
12. Jordan, J.\*, **Naito, C.**, "An Experimental Investigation of the Effect of Nose Shape on Fragments Penetrating GFRP," Elsevier International Journal of Impact Engineering, Vol. 63, pp.63-71, Jan. 2014, DOI: 10.1016/j.ijimpeng.2013.08.002.
13. Jordan, J.\*, **Naito, C.**, Haque, B. Z., "Quasi-Static, Low-Velocity Impact and Ballistic Impact Behavior of Plain Weave E-Glass/Phenolic Composites," Sage Journal of Composite Materials, Vol. 48, No. 20, pp.2505-2516, Published online August 2013, In-Print August 2014, DOI: 10.1177/0021998313499952.
14. Dorvash, S., Pakzad, S., **Naito, C.**, Hodgson, I., Yen, B., "Application of State of the Art in Measurement and Data Analysis Techniques for Vibration Evaluation of a Tall Building," Taylor and Francis Journal of Structure and Infrastructure Engineering, Vol. 10, No. 5, pp. 654-669, Published Online Jan 2013, In-Print May 2014, DOI: 10.1080/15732479.2012.757795.
15. Xiao, S., Suleiman, M., **Naito, C.**, Neti, S., "Use of Geothermal Energy for Bridge Deicing," Transportation Research Record: Journal of the Transportation Research Board, Transportation Research Board of the National Academies, Vol. 2363, pp.56-65, Nov. 2013, DOI: 10.3141/2363-07.
16. Fleischman, R. B., Restrepo, J., **Naito, C.**, Sause, R., Zhang, D., Schoettler, M., "Integrated Analytical and Experimental Research to Develop a New Seismic Design Methodology for Precast Concrete Diaphragms," ASCE Journal of Structural Engineering, Vol. 139, No. 7, July 2013, pp.1192-1204, DOI:10.1061/(ASCE)ST.1943-541X.0000734.
17. **Naito, C.**, Cox, D., Yu, Q., Brooker, H.\*, "Fuel Storage Container Performance During the 2011 Tohoku Japan Tsunami," ASCE Journal of Performance of Constructed Facilities, Vol. 27, No. 4, August 2013, pp.373-380. DOI: 10.1061/(ASCE)CF.1943-5509.0000339 (2013 JPCF Outstanding Paper Award).
18. **Naito, C.**, Li, X.\*, Hodgson, I., Yen, B., "Fatigue Crack Formation and Repair Strategies for Steel Cantilever Bracket Tie Plates," ASCE Journal of Bridge Engineering, Vol. 18, No. 6, June 2013, pp. 516-524, DOI: 10.1061/(ASCE)BE.1943-5592.0000391.
19. **Naito, C.**, Ren, R.\*, "An Evaluation Method for Precast Concrete Diaphragm Connectors Based on Structural Testing," Journal of the Precast/Prestressed Concrete Institute, Vol. 58, No. 2, Spring 2013, pp.106-118.
20. Ren, R.\*, **Naito, C.**, "Precast Concrete Diaphragm Connector Performance Database," ASCE Journal of Structural Engineering, Vol.139, No.1, Jan., 2013, pp. 15-27. DOI: 10.1061/(ASCE)ST.1943-541X.0000598
21. Paczkowski, K., Riggs, H.,R., **Naito, C.**, Lehmann, A.\*, "A One-Dimensional Model For Impact Forces Resulting From High Mass, Low Velocity Debris," Structural Engineering and Mechanics, An Int'l Journal, Techno Press, Vol.42, No.6, 2012, pp. 831-847.
22. **Naito, C.**, Zimpfer, J.\*, Sause, R., Kaufmann, E., "Effect of Environmental Conditions on Field Welding of Precast Concrete Connections," Journal of the Precast/Prestressed Concrete Institute, Vol.57, No.2, Spring 2012, pp.142-161.

23. **Naito, C.**, Hoemann, J., Beacraft, M.\*, Bewick, B., “Performance And Characterization Of Shear Ties For Use In Insulated Precast Concrete Sandwich Wall Panels,” ASCE Journal of Structural Engineering, Vol.138, No.1, Jan. 2012, pp.52-61, DOI: 10.1061/(ASCE)ST.1943-541X.0000430.
24. Sause, R., Frosch, R., Ghosh, S.K., Lien, J., **Naito, C.**, Sennour, L., Yamanishi, T., “Preview of PCI’s Japan Earthquake Reconnaissance Team Report,” Journal of the Precast/Prestressed Concrete Institute, Vol. 57, No.1, Winter 2012, pp.47-51.
25. **Naito, C.**, Dinan, R., and Bewick, B., “Use of Precast Concrete Walls for Blast Protection of Steel Stud Construction,” ASCE Journal of Performance of Constructed Facilities, Vol.25, No.5, 2011, p.454-463. DOI: 10.1061/(ASCE)CF.1943-5509.0000228.
26. Zhang, D., Fleischman, R. B., **Naito, C.**, and Ren, R.\*, “Experimental Evaluation of Pretopped Precast Diaphragm Critical Flexure Joint under Seismic Demands,” ASCE Journal of Structural Engineering, Vol.137, No.10, 2011, p. 1063-1074. DOI:10.1061/(ASCE)ST.1943-541X.0000352.
27. **Naito, C.**, Jones, L.\*, and Hodgson, I., “Development of Rating Procedures for Adjacent Prestressed Concrete Box Girder Bridges,” ASCE Journal of Bridge Engineering, Vol.16, No.5, 2011, pp. 662-670. DOI:10.1061/(ASCE)BE.1943-5592.0000186.
28. **Naito, C.**, Sause, R., Hodgson, I., Pessiki, S., Macioce, T., “Forensic Examination of a Non-Composite Adjacent Precast Prestressed Concrete Box Beam Bridge,” ASCE Journal of Bridge Engineering, Vol.15, No.4, July-August 2010, pp.408-418, DOI:10.1061/(ASCE)BE.1943-5592.0000110.
29. Jordan, J.\*, **Naito, C.**, “Calculating Fragment Impact Velocity from Penetration Data,” Elsevier International Journal of Impact Engineering, Vol. 37, No.5, May 2010, pp. 530-536, DOI:10.1016/j.ijimpeng.2009.11.002.
30. Chun, S., Oh, B., Lee, S., **Naito, C.**, “Anchorage Strength of Headed Bars in Exterior Beam-Column Joints,” ACI Structural Journal, Vol., 106, No.5, Sept.-Oct., 2009, pp. 579-589.
31. Cetisli, F.\*, **Naito, C.**, “Concrete Subjected to Varying Confinement, I: Experimental Evaluation” Journal of Advanced Concrete Technology, Japan Concrete Institute, Vol.7, No. 2, June 2009, pp. 239-249.
32. Cetisli, F.\*, **Naito, C.**, “Concrete Subjected to Varying Confinement, II: Modeling,” Journal of Advanced Concrete Technology, Japan Concrete Institute, Vol.7, No. 2, June 2009, pp. 251-261.
33. **Naito, C.**, Cao, L.\*, Peter, W.\*, “Precast Double-Tee Floor Connectors Part I: Tension Performance,” Journal of the Precast/Prestressed Concrete Institute, Vol. 54, No. 1, Winter, 2009, pp. 49-66. (PCI Charles C. Zollman Award for 2009)
34. Cao, L.\*, **Naito, C.**, “Precast Double-Tee Floor Connectors Part II: Shear Performance,” Journal of the Precast/Prestressed Concrete Institute, Vol. 54, No. 2, Spring, 2009 pp. 97-115. (PCI Charles C. Zollman Award for 2009)
35. **Naito, C.**, Sause, R., Thompson, B., “Investigation Of Damaged 12-Year Old Prestressed Concrete Box Beams,” ASCE Journal of Bridge Engineering, Vol. 13, No. 2, Feb. 2008, pp. 139-148, DOI: 10.1061/(ASCE)1084-0702(2008)13:2(139).
36. Cao, L.\*, **Naito, C.**, “Design of Precast Diaphragm Chord Connections for In-Plane Tension Demands,” ASCE Journal of Structural Engineering, Vol. 133, No. 11, November 2007, pp. 1627-1635, DOI: 10.1061/(ASCE)0733-9445(2007)133:11(1627).
37. Cramsey, N.\*, **Naito, C.**, “Analytical Assessment of the Blast Resistance of Precast, Prestressed Concrete Components,” Journal of the Precast/Prestressed Concrete Institute, Vol. 52, No. 6, Nov-Dec, 2007, pp. 67-80.
38. **Naito, C.**, Parent, G.\*, Brunn, G.\*, “Ultimate Strength of Self Consolidating Concrete Bulb Tee Beams,” Journal of the Precast/Prestressed Concrete Institute, Vol. 51, No. 6, Nov-Dec, 2006, pp. 72-85.
39. **Naito, C.**, Cetisli, F.\*, “Accuracy and Improvements for Variable and Constant Confinement Concrete Models,” American Concrete Institute Special Publication 238 International Symposium on Confined Concrete, Paper SP-238-10, Detroit, MI, Dec., 2006, pp. 157-176.
40. **Naito, C.**, Wheaton, K.\*, “Blast Assessment of Load Bearing Reinforced Concrete Shear Walls,” ASCE Practice Periodical on Structural Design and Construction, Vol. 11, No. 2, May, 2006, pp. 112-121, DOI: 10.1061/(ASCE)1084-0680(2006)11:2(112).
41. Fleischman, R. B., **Naito, C.**, Restrepo, J., Sause, R., Ghosh, S. K., Wan, G., Schoettler, M., Cao, L.\* “Precast Diaphragm Seismic Design Methodology (DSDM) Project, Part 2: Research Program,” Journal of the

Precast/Prestressed Concrete Institute, Vol. 50, No. 6, Nov.-Dec., 2005, pp. 14-31. (PCI Charles C. Zollman Award for 2006)

42. Fleischman, R., **Naito, C.**, Restrepo, J., Sause, R., Ghosh, S., "Precast Diaphragm Seismic Design Methodology (DSDM) Project, Part 1: Design Philosophy and Research Approach," Journal of the Precast/Prestressed Concrete Institute, Vol. 50, No. 5, Sept.-Oct., 2005, pp. 68-83. (PCI Charles C. Zollman Award for 2006)
43. **Naito, C.**, "Anchorage of Reinforced Concrete Parapets on GFRP Bridge Decks," ASCE Journal of Composites for Construction, Vol. 9, No. 3, May-June, 2005, pp. 247-254. DOI: 10.1061/(ASCE)1090-0268(2005)9:3(247). (2005 ASCE Journal of Composites for Construction Best Paper Award: Honorable Mention Applied Research Paper)
44. Zhang, Y., Sause, R., Ricles, J., **Naito, C.**, "Modified Predictor-Corrector Numerical Scheme for Real-Time Pseudo Dynamic Rest Using State-Space Formulation," Journal of Earthquake Engineering and Structural Dynamics, John Wiley and Sons, Vol. 34, No. 3, Mar., 2005, pp. 271-288, DOI: 10.1002/eqe.425.
45. Mosalam, K., **Naito, C.**, Khaykina, S., "Bidirectional Cyclic Performance of Reinforced Concrete Bridge Column-Superstructure Subassemblies," Earthquake Spectra, Vol. 18, No. 4, Nov., 2002, pp. 663-687, DOI: 10.1193/1.1516751.
46. Mosalam, K., **Naito, C.**, "Seismic Evaluation of Gravity-Load-Designed Column-Grid System," ASCE Journal of Structural Engineering, Vol. 128, No. 2, Feb., 2002, pp. 160-168, DOI: 10.1061/(ASCE)0733-9445(2002)128:2(160).
47. **Naito, C.**, Moehle, J., Mosalam, K., "Evaluation of Bridge Beam-Column Joints Under Simulated Seismic Loading," ACI Structural Journal, Vol. 99, No. 1, Jan., 2002, pp. 62-71.
48. Olmati, P.\*, Trasborg, P.\*, **Naito, C.**, Bontempi, F., "Blast Resistance of Reinforced Precast Concrete Walls Under Uncertainty," International Journal of Critical Infrastructures, Special Issue on International Perspectives on Full Spectrum Resilience, Inderscience Enterprises Ltd., Manuscript IJCIS-60911, Accepted July 2013
49. Nickerson, J., Trasborg, P., **Naito, C.**, Newberry, C., Davidson, J. S., "Finite Element Assessment of Methods for Incorporating Axial Load Effects into Blast Design SDOF Analyses of Precast Wall Panels," ASCE Journal of Performance of Constructed Facilities, Manuscript CFENG-1035R1, Accepted June 2014.
50. Trasborg, P.\*, Nickerson, J., **Naito, C.**, Olmati, P.\*, Davidson, J., "Forming a Stable Flexural Mechanism in Thin Reinforced Concrete Elements," ACI Structural Journal, Manuscript ID S-2013-371.R3, Accepted July 2014.
51. Ko, H., Cox, D., Riggs, R., **Naito, C.**, "Hydraulic Experiments on Impact Forces from Tsunami-Driven Debris," ASCE Journal of Waterway, Port, Coastal, and Ocean Engineering, Accepted September 2014, DOI: 10.1061/(ASCE)WW.1943-5460.0000286, 04014043.
52. **Naito, C.**, Cetisli, F., Tate, T.\*, "A Method for Quality Assurance of 7-Wire Strand Bond in Portland Cement Concrete," Journal of the Precast/Prestressed Concrete Institute, Manuscript Number 14-029, Accepted January 2015.
53. Piran Aghl, P.\*, **Naito, C.**, Riggs, H., "Effect of Nonstructural Mass on Debris Impact Demands: Experimental and Simulation Studies," Elsevier Journal of Engineering Structures, Manuscript ENGSTRUCT-D-14-00598R3, Accepted January 2015.
54. Nickerson, J., Trasborg, P., **Naito, C.**, Newberry, C., Davidson, J. S., "Finite Element Evaluation of Blast Design Response Criteria for Load-Bearing Precast Wall Panels," International Journal of Protective Structures, Vol.6, No.1, 2015, pp. 155-173. Accepted February 2015.

#### *Submitted Papers in Review*

1. Piran Aghl, P.\*, **Naito, C.**, Riggs, H., "Study of Demands Resulting from Transverse Impact of High Mass, Low Velocity Debris," ASCE Journal of Structural Engineering, Manuscript Steng-4114, Submitted January 2015.
2. Quiel, S., Fallon, C., T., **Naito, C.**, "Quantifying the Robustness of Building Frames to Progressive Collapse: Uniform Pushdown for Single Column Removals," Elsevier Journal of Engineering Structures, Submitted October 2014.

3. Trasborg, P.\*, Naito, C., Davidson, J., “Experimental Performance and Predictive Modeling of Partially Composite Insulated Precast Concrete Panels,” ASCE Journal of Structural Engineering, Manuscript Number STENG-3729, July 2014.
4. Piran Aghl, P.\*, Naito, C., Riggs, H., “A Simplified Model for Estimating Axial Impact Forces Resulting from Debris with Nonstructural Mass,” Structural Engineering and Mechanics, An International Journal, Techno Press, Manuscript SEM47946C, June 2014.
5. Olmati, P.\*, Trasborg, P.\*, Naito, C., Sgambi, L., Bontempi, F., “Modeling the Response of Concrete Slabs Under Blast Loading,” ACI Special Publication, March 2014.
6. Trasborg, P.\*, Naito, C., Bocchini, P., Olmati, P., “Fragility Analysis for Ballistic Design,” Elsevier Journal of Structural Safety, Manuscript STRUCS-D-14-00038, February 2014.

### **Invited Non-Refereed Journal Papers**

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1. Naito, C., Cox, D., Yu, Q., “Impact of Tsunami Generated Debris during the 2011 Tohoku Japan Tsunami,” Structural Engineer, pp.24-27, Zweigwhite, November 2011.
2. Naito, C., “Blast-Resistant Design Considerations – What architects need to know to meet federal blast-resistance requirements,” Ascent Magazine, Precast/Prestressed Concrete Institute, Winter 2011, pp.28-31.
3. Trasborg, P.\*, Naito, C., “Shear Tie Connectors for Composite Action in Insulated Concrete Wall Systems,” Cpi Concrete Plant International North America Edition, December 2013.

### **Conference Papers**

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1. Fallon, C.\*, Quiel, S., Naito, C., “Evaluating the Robustness of Precast Concrete Framing Enhancements for Progressive Collapse Resistance,” Fifth International Workshop on Performance, Protection & Strengthening of Structures under Extreme Loading, Michigan, June 2015.
2. Dorvash, S., Pakzad, S., Naito, C., “In-service Vibration Monitoring of a Tall Building Structure with Wired and Wireless Sensor Networks,” ASCE SEI Structures Congress, Boston, MA, April 2014.
3. Piran Aghl, P.\*, Naito, C., Riggs, H., “Investigating the Effect of Nonstructural Mass on Debris Impact Forces,” ASCE SEI Structures Congress, Boston, MA, April 2014.
4. Piran Aghl, P.\*, Naito, C., Riggs, H., “An Experimental Study of Demands Resulting from In-Air Impact of Debris,” 11<sup>th</sup> International Conference on Structural Safety & Reliability, June 2013, NYC, NY, USA (Refereed).
5. Riggs, H., Cox, D., Naito, C., Kobayashi, M., Ko, H., Piran Aghl, P.\*, Khowitar, E., “Water-Driven Debris Impact Forces on Structures: Experimental and Theoretical Program,” Proceedings of the ASME 2013 32nd International Conference on Ocean, Offshore and Arctic Engineering, OMAE2013, Paper 11128, June 2013, p.10, doi:10.1115/OMAE2013-11128 (Refereed).
6. Naito, C., Cleland, N., Brews, J., “Design for Disproportionate Collapse Prevention of Precast and Prestressed Structures,” ASCE SEI Structures Congress, Paper 417, Pittsburgh, PA, May 2013.
7. Lai, L. Naito, C., Kim, P., Jen, T., “Inspection and Evaluation of Non-Composite Prestressed Concrete Adjacent Box Beam Bridges,” International Bridge Conference, Paper IBC-11-63, Pittsburg, PA June 2011. (Refereed).
8. Naito, C., Xiang, L.\*, Hodgson, I., and Yen, B., “Fatigue Crack Formation and Repair Strategies For Steel Floor Beam Tie Plates Due to Secondary Displacements On Plate Girder-Stringer Bridges,” Transportation Research Board Annual Convention, Paper 11-2945, Washington, DC, January 2011. (Refereed)
9. Naito, C., Jones, L.\*, “Non-Destructive Inspection of Strand Corrosion in Prestressed Concrete Box Beam Members,” NDE/NDT for Highways and Bridges: Structural Materials Technology (SMT), New York, NY, August 2010.
10. Ren, R.\*, Naito, C., “Performance of Precast Concrete Diaphragm Connectors Based on Structural Testing,” 2010 ASCE Structures Congress, Paper 885, Orlando, FL, May 2010.
11. Naito, C., Beacraft, M., Hoemann, J., “Design Limits for Precast Concrete Sandwich Walls Subjected to External Explosions,” 2010 ASCE Structures Congress, Paper 711, Orlando, FL, May 2010.

12. **Naito, C.**, “Failure Modes and Inspection Methods For Non-Composite Adjacent Prestressed Concrete Box Beam Bridges,” 2009 PCI National Bridge Conference, San Antonio, TX, Sept. 2009.
13. **Naito, C.**, Fisher, J., Dinan, R., “Expeditionary Structure Construction Method for Blast and Ballistic Protection,” 13<sup>th</sup> International Symposium on the Interaction Effects of Munitions with Structures (ISIEMS), Bruhl, Germany, May 2009.
14. **Naito, C.**, Shull, J., Hoemann, J., Dinan, R., “Performance of Tilt-Up and Precast/Prestressed Concrete Sandwich Walls Subjected to External Explosions,” 2008 SAVIAC – 79th Shock & Vibration Symposium, Orlando, FL, Oct. 2008.
15. **Naito, C.**, Ren, R.\*, “Evaluation Methodology For Precast Concrete Diaphragm Connectors Based On Structural Testing,” 14<sup>th</sup> World Conference on Earthquake Engineering, Beijing, China, Oct. 2008
16. Grumbach, S., **Naito, C.**, Dinan, R., “Use of Precast Concrete Walls for Blast Protection of Steel Stud Wall Construction,” 2007 SAVIAC – 78th Shock & Vibration Symposium, Philadelphia, PA, Oct. 2007.
17. **Naito, C.**, Fisher, J., Dinan, R., “Blast Resistance of Precast, Prestressed Concrete Building Wall Panels,” Paper USA04, PROTECT 2007 – Performance, Protection and Strengthening of Structures Under Extreme Loading, Whistler, Canada, Aug. 2007.
18. Deschenes, D., **Naito, C.**, “Horizontal Shear Capacity of Composite Concrete Beams Without Ties,” PCI National Bridge Conference, Grapevine, TX, October, 2006, Paper 34. (Refereed)
19. Cao, L.\* and **Naito, C.**, Peter, W., “Contributions of Pre-Topped Diaphragm Connectors to Joint Flexural and Shear Strength,” 8th U.S. National Conference on Earthquake Engineering, San Francisco, CA, Apr., 2006, Paper 758. (Refereed)
20. Fleischman, R., Ghosh, S.K., **Naito, C.**, Restrepo, J., Sause, R., “Development of a Seismic Design Methodology for Precast Diaphragms,” 8th U.S. National Conference on Earthquake Engineering, San Francisco, CA, Apr., 2006, Paper 1633. (Refereed)
21. Pamukcu, S., Cetisli, F.\*, **Naito, C.**, Toulouse, J., “Dynamic Strains with Brillouin Scattering Distributed Fiber Optic Sensor,” ASCE Geo Congress 2006, Atlanta, GA, Feb., 2006.
22. **Naito, C.**, Hoover, M., “Applicability of Self Consolidating Concrete for Use in Precast Bridge Beam Construction,” Fourth International RILEM Symposium on Self-Compacting Concrete, Chicago, IL., Oct.-Nov., 2005.
23. Zhang, Y., Cheng, L., **Naito, C.**, “A Study of Wireless MEMS Accelerometers for Civil Infrastructure Monitoring,” IEEE MTT-S 2005 International Microwave Symposium [Proceedings], Long Beach, CA, June, 2005, Paper 5003.
24. **Naito, C.**, “Freshmen Level Design – Bridge Building Project,” Proceedings of the 2005 ASEE Gulf-Southwest Annual Conference, Mar., 2005, Paper F2D4.
25. **Naito, C.**, Cetisli, F.\*, “Accuracy and Improvements for Variable and Constant Confinement Concrete Models,” International Symposium on Confined Concrete [Proceedings], Changsha, China, June, 2004, Paper 10.
26. Wan, G., Fleischman, R., **Naito, C.**, Restrepo, J., Sause, R., Cao, L.\*, Schoettler, M., Ghosh, S., “Integrated Analytical and Experimental Research Program to Develop a Seismic Design Methodology for Precast Diaphragms,” Proceedings of SEAOC Convention, Monterey, CA, Aug., 2004.
27. **Naito, C.**, Cao, L.\*, “Precast Diaphragm Panel Joint Connector Performance,” 13<sup>th</sup> World Conference on Earthquake Engineering [Proceedings], Vancouver, Canada, Aug., 2004, Paper 2722. (Refereed)
28. Fleischman, R., Restrepo, J., Sause, R., **Naito, C.**, Ghosh, S., “Development of a Seismic Design Methodology for Precast Diaphragms,” 13<sup>th</sup> World Conference on Earthquake Engineering [Proceedings], Vancouver, Canada, Aug. 2004, Paper 2860. (Refereed)
29. Ricles, J., Sause, R., **Naito, C.**, Zhang, Y., Pamukcu, S., “NEES Real-Time Multi-Directional Seismic Testing Facility for Large Scale Structures,” 13<sup>th</sup> World Conference on Earthquake Engineering [Proceedings], Vancouver, Canada, Aug., 2004, Paper 1607. (Refereed)
30. **Naito, C.**, Mosalam, K., Mahin, S., “Rehabilitation of Open Front Wood-Frame Buildings,” 12<sup>th</sup> European Conference on Earthquake Engineering [Proceedings], Elsevier Science Ltd., London, Sept., 2002, Paper No. 540.

31. **Naito, C.**, Mosalam, K., Moehle, J., “Evaluation of Reinforced Concrete Bridge Joints,” 12<sup>th</sup> World Conference on Earthquake Engineering [Proceedings], Auckland, New Zealand, 2000, Paper 1903. (Refereed)

### **Publicly Available Reports**

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1. Aghl, P. P., **Naito, C.**, Sause, R., “PA Flex Beam Preliminary Analysis,” ATLSS Report No. 15-01, ATLSS Center, Lehigh University, January 2015, 26 pages.
2. Naito, C., Aghl, P. P., “In-Plane Performance of the Meadow Burke Chord Connector,” ATLSS Report No. 14-04, ATLSS Center, Lehigh University, December 2014, 45 pages.
3. **Naito, C.**, “ABET Self-Study Report for the Civil Engineering Program at Lehigh University,” Bethlehem, PA, June 2013, 211 pages.
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10. Jones, L.\*, **Naito, C.**, Hodgson, I., Pessiki, S., “Inspection Methods and Techniques to Determine Non Visible Corrosion of Prestressing Strands in Concrete Bridge Components Task 2 – Assessment of Candidate NDT Methods,” ATLSS Report No. 09-09, ATLSS Center, Lehigh University, June 2010, 176 pages.
11. Warncke, J.\*, **Naito, C.**, Hodgson, I., “Evaluation of Transverse Reinforcement Requirements for Reinforced Concrete Bridge Piers in Seismic Regions - Literature Review and Recommendations,” ATLSS Report No. 09-06, August 2009, 77 pages.
12. **Naito, C.**, Hoemann, J., Bewick, B., and Hammons, M., “Evaluation of Shear Tie Connectors for Use in Insulated Concrete Sandwich Panels,” Air Force Research Laboratory, Airbase Technologies Division Technical Report, AFRL-RX-TY-TR-2009-4600, Distribution A, December 2009, December 2009, 31 pages.
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22. **Naito, C.**, Warncke, J.\*, “Inspection Methods & Techniques to Determine Non Visible Corrosion of Prestressing Strands in Concrete Bridge Components Task 1 – Literature Review,” ATLSS Report No. 08-06, ATLSS Center, Lehigh University, Sept. 2008, pp.71.
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24. Zimpfer, J.\*, **Naito, C.**, Sause, R., and Kaufmann, E., “Investigation of the Impact of Environmental Conditions on Field Welding of Precast Concrete Connections,” ATLSS Report No. 07-03, April 2008, 194 pages.
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32. Tate, T.\*, and **Naito, C.**, “Evaluation of Bond Mechanics in Prestressed Concrete Applications,” ATLSS Report No. 05-10, ATLSS Center, Lehigh University, July, 2005, 134 pages.
33. Walsh, M.\*, Deschenes, D.\*, **Naito, C.**, “Horizontal Shear Capacity of Composite Concrete Beams Without Ties Literature Review and Test Program,” ATLSS Report No. 05-09, ATLSS Center, Lehigh University, June, 2005, 70 pages.
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## Abstracts

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3. Fallon, C.\*, Quiel, S., **Naito, C.**, “Evaluating the Robustness of Precast Concrete Framing Enhancements for Progressive Collapse Resistance,” Fifth International Workshop on Performance, Protection & Strengthening of Structures under Extreme Loading, Michigan, June 2015.
4. **Naito, C.**, Cercone, C.\*, Riggs, R., Cox, D., “Debris Dispersal and Damage Generated During Tsunamis,” Quake Summit 2013, August 2013, Reno NV.
5. Ko, H., Riggs, H.R., Cox, D.T., Kobayashi, M.H., **Naito, C.**, and Piran Aghl, P.\*, “Impact Forces from Tsunami-Driven Debris”, AGU Fall Meeting, San Francisco, CA, USA, Dec. 2012.
6. Svyantek, M., Nickerson, J.\*, Trasborg, P.\*, Newberry, C., **Naito, C.**, Davidson, J., “Blast Design Considerations for Load-bearing PC/PS Sandwich Panels used in Multi-story Total Precast Construction,” Submitted April 2013 for consideration for presentation at the 10th International Conference on Shock & Impact Loads on Structures 25-26 November 2013, Singapore.
7. **Naito, C.**, Trasborg, P.\*, “Development of Blast Resilient Precast Concrete Wall Panels for Buildings,” A Workshop On: Resiliency of the National Building Inventory: Creating a Roadmap for the Future, September 2011, The University of Southern California.
8. Ren, R.\*, Cullen, T.\*, **Naito, C.**, “Experimental and Analytical Evaluation of Unbonded Post-Tensioned Strand Chord Reinforcement for Precast Concrete Diaphragms,” ASCE Structures Congress, Las Vegas NV, April 2011 (submitted June 2010, abstract 734).
9. **Naito, C.**, Hoemann, B., Shull, J., Bewick, B., “Blast Performance of Multi-Span Precast Concrete Sandwich Wall Panels,” ASCE Structures Congress, Las Vegas NV, April 2011 (submitted June 2010, abstract 763).
10. Shull, J., **Naito, C.**, Hoemann, J., Bewick, B., “Performance of Single Span Conventionally Constructed Concrete Sandwich Panels to Blast Effects,” Session 33, 81st Annual Shock and Vibration Information Analysis Center, SAVIAC, Orlando, FL, Oct., 2010.
11. **Naito, C.** and Hoemann, J., “Design and Characterization of Precast Concrete Sandwich Walls to External Explosions,” Paper ID 711, 2010 ASCE SEI Structures Congress, Orlando, FL, May 2010.
12. Ren, R.\* and **Naito, C.**, “Performance of Precast Concrete Diaphragm Connectors Based on Structural Testing,” Paper ID 885, 2010 ASCE SEI Structures Congress, Orlando, FL, May 2010.
13. **Naito, C.**, “Failure Modes and Inspection Methods for Prestressed Concrete Adjacent Box Beam Bridges,” 2009 PCI Annual Convention/Exhibition & National Bridge Conference, San Antonio, TX, Sept., 2009.

14. **Naito, C.**, Davidson, J., Hoemann, J., Shull, J., and Dinan, R., "Performance of Energy efficient Conventional Insulated Concrete Walls Under Blast Demands," 2009 USACE Infrastructure Systems Conference, Cleveland, OH, July 2009.
15. **Naito, C.**, Fisher, J., Dinan, R., "Expeditionary Structure Construction Method for Blast and Ballistic Protection," 13<sup>th</sup> International Symposium on the Interaction of the Effects of Munitions with Structures, Bruhl, Germany, May, 2009.
16. **Naito, C.**, Hoemann, J., Dinan, R., "Performance of Tilt-up and Precast/Prestressed Concrete Sandwich Walls Subjected to External Explosions," 79th Annual SAVIAC, Orlando, FL, Oct., 2008.
17. **Naito, C.**, Hodgson, I., Sause, R., Pessiki, S., "Forensic Evaluation Of 45 Year Old Prestressed Concrete Box Beams From The Lakeview Drive Bridge Collapse," PIMS08-0068 Fourth International Conference on Bridge maintenance, Safety and Management, Seoul, Korea, July, 2008.
18. Hodgson, I., **Naito, C.**, Sause, R., Pessiki, S., "Evaluation of Prestressed Box Beams From the Lake View Drive Bridge Over I70," International Bridge Conference, Western Pennsylvania Transportation Research Forum, Pittsburgh, PA, June 2007.
19. **Naito, C.**, Fleischman, R., Restrepo, J., Sause, R., Ghosh, S.K., "Progress on the NEES DSDM Precast Concrete Diaphragm Project," 5<sup>th</sup> NEES Annual Meeting, Snowbird, UT, June 2007.
20. **Naito, C.**, Fisher, J., Dinan, R., "Blast Resistance of Precast, Prestressed Concrete Building Wall Panels," PROTECT 2007, Whistler, Canada, Aug. 2007.
21. **Naito, C.**, Pessiki, S., Sause, R., Hodgson, I., "Forensic Evaluation of Prestressed Box Beams from the Lake View Drive Bridge Over I70," ASCE Structures Congress, Long Beach, CA 2007.
22. **Naito, C.**, Deschenes, D.\*, "Horizontal Shear Capacity of Composite Concrete Beams Without Ties," PCI-FHWA 2006 National Bridge, Grapevine, TX, October, 2006.
23. Cao, L.\*, **Naito, C.**, Peter, W.\*, Sause, R., "Performance of Pretopped Precast Floor Diaphragm Connectors," 8th U.S. National Conference on Earthquake Engineering, San Francisco, CA, Apr., 2006.
24. **Naito, C.**, "Self Consolidating Concrete Test Results and Strand Bond Qualifications," 7<sup>th</sup> Annual Pennsylvania Conference on Concrete, Hershey, PA, January, 2006.
25. Cao, L.\*, **Naito, C.**, "Design of Precast Diaphragm Connections for In-Plane Seismic Demands," ASCE Special Publication on Precast/Prestressed Concrete Structures under Natural and Human-made Hazards, Sept., 2005.
26. **Naito, C.**, "Comparative Performance of High Early Strength and Self Consolidating Concrete Materials for Use in Precast Bridge Construction," 6<sup>th</sup> Annual Pennsylvania Conference on Concrete, Hershey, PA, January, 2005.
27. Cheng, L., **Naito, C.**, Sause, R., "Dynamic Wireless Sensor Networks in Civil Infrastructure Monitoring," First ACM International Workshop on Applications of Mobile Embedded Systems, Boston, MA, June, 2004.
28. **Naito, C.**, "Blast Resistance Research for Hardening and Survivability of Large Structures," Homeland Security Advanced Research Projects Agency (HSARPA) Technology Workshop, Baltimore, MD, June, 2004.

## Patents

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Patent: Ductile Chord Connectors for Use in Concrete Rods in Structures, Inventor: Clay Naito, Publication date: 2013/3/29, Patent office: WO, Patent number: 2013043233

Provisional Patent: Comb-Tie Insulated Wall Panel Connector, Inventors: Clay Naito and Patrick Trasborg, Provisional Patent Application Number: 62022397, Filing Date: 2014/7/9.

## Honors and Awards

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1. 2014 Leslie D. Martin Award of Merit to the PCI DSDM Industry Advisory Committee and Researcher Partners in recognition and appreciation for the outstanding Technical Report "Seismic Design Methodology Document for Precast Concrete Diaphragms."
2. 2013 Outstanding Paper Award from the ASCE Journal of Performance of Constructed Facilities for the manuscript Fuel Storage Container Performance During the 2011 Tohoku Japan Tsunami.

3. 2013 First place in Blast Blind Simulation Contest, Category 1: Normal Concrete, Normal Strength Steel – Advanced Modeling, Organized by University of Missouri Kansas City and sponsored in collaboration with ACI Committees 447 and 370. Team: Pierluigi Olmati (SUR), Patrick Trasborg (LU), Dr. Luca Sgambi (PM), Prof. Franco Bontempi (SUR), and Prof. Clay Naito (LU).
4. 2013 2<sup>nd</sup> place in Blast Blind Simulation Contest, Category 2: Normal Concrete, Normal Strength Steel – Analytical or SDOF Modeling, Organized by University of Missouri Kansas City and sponsored in collaboration with ACI Committees 447 and 370. Team: Patrick Trasborg (LU), Pierluigi Olmati (SUR), Dr. Luca Sgambi (PM), Prof. Clay Naito (LU), and Prof. Franco Bontempi (SUR).
5. 2012 Precast/Prestressed Concrete Institute's George D. Nasser Award. This award recognizes that paper published in the PCI Journal that is most "worthy of special commendation for its merit on the design, research, production or construction of precast/prestressed concrete structures" for authors who are 40 years of age or under.
6. 2009 PCI Charles C. Zollman Award for coauthoring a two-part paper published in the Spring and Winter 2009 issues of the PCI Journal, which was judged worthy of special commendation for its merit as a contribution in advancing the state-of-the-art of precast and prestressed concrete.
7. 2008 Precast/Prestressed Concrete Institute Young Educator Achievement Award. For several years of outstanding service and to the precast, prestressed concrete industry.
8. P.C. Rossin Assistant Professorship at Lehigh University for the academic years 2006 and 2007. For demonstrating high potential for establishing a successful academic career at Lehigh University through the integration of teaching and research.
9. 2006 PCI Charles C. Zollman Award for coauthoring a two-part paper published in the Sept.-Oct. and Nov.-Dec. 2005 issues of the PCI Journal, which was judged worthy of special commendation for its merit as a contribution in advancing the state-of-the-art of precast and prestressed concrete.
10. 2006 ASCE Construction Institute Certificate of Recognition for the Honorable Mention Applied Research Paper published in the Journal of Composites for Construction in 2005 titled "Anchorage of Reinforced Concrete Parapets on Glass Fiber Reinforced Polymer Bridge Decks."
11. 2005 Hillman Award for Excellence in Undergraduate Advising at Lehigh University. Exemplary undergraduate student advising through guidance of students through their exploration and pursuit of an academic course of study; and/or through assisting students in the development and/or completion of research related to their degree program.

## **Funded Projects**

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### ***Initiated in 2015 (\$36,899)***

Title: "Progressive Collapse Resistant Building Frames: Precast Concrete Design Solutions"  
 Agency: Pennsylvania Infrastructure and Technology Alliance Amount: \$36,899  
 Period: FY2015 Type: Competitive LU grant  
 PI: Quiel, S., Naito, C. (Co-PI)

### ***Initiated in 2014 (\$435,281)***

Title: "Design Approach for PennDOT FlexBeam Design (Concrete –Steel Composite System)"  
 Agency: Pennsylvania Department of Transportation via M&M Amount: \$33,240  
 Period Covered: 8/13/14 – 1/23/15 Type: External grant  
 PI: C. Naito and R. Sause Account: 526960 – E03134 Work Order #4

Title: "Update of PennDOT Seismic detailing requirements for concrete bridges"  
 Agency: Pennsylvania Department of Transportation via HDR Amount: \$7,916  
 Period Covered: 8/1/2014 – 8/31/2015 Type: External grant  
 PI: C. Naito Account: 526909 – E02782 Work Order #1

Title: "Innovation Corps Team Program: Innovative Insulated Wall Panel Connector"  
 Agency: NSF Amount: \$50,000 Period: 9/1/14-2/28/15  
 PI: Naito, C. Account: 543128 Type: Competitive external grant

Title: "Long-term Behavior of Geothermal Deep Foundation Systems in Cooling-Dominated Environments"  
 Agency: Qatar University Amount: \$309,125 Period: 5/14-4/17  
 PI: Suleiman, M., Co-PIs: Neti, S., Naito, C.(0.5mo) Status: Awarded Type: Competitive external grant

Title: "PCI Jenny Fellowship: Progressive Collapse Resistance of Precast Concrete Frames: Design Criteria and Connection Detailing"  
 Agency: PCI Amount: \$35,000 Period: 6/2014 to 12/31/2015

Team: S. Quiel (PI), C. Naito (co-PI)      Type: Competitive external grant

**Initiated in 2013 (\$28,505)**

Title: "Prestressed Concrete Strand Bond Assessment"

Agency: CABA      Amount: \$3,500      Period: 6/13/2013 to 12/31/2013  
PI: C. Naito      Account: 524282      Type: Non-competitive grant

Title: "Bridge Deicing Using Geothermal Foundations"

Agency: PITA (S00004763)      Amount: \$25,005      Period: 1/1/13 to 1/30/2014  
Team: M. Suleiman (PI), Co-PI's: C. Naito and S. Neti      Account: 542942  
Type: Competitive LU grant

**Initiated in 2012 (\$98,330)**

Title: "Fiber-optic sensor Array to Determine Dynamic Projectile Interactions in Helmet Testing"

Agency: DOD (S00004763)      Amount: \$93,880      Period: 6/15/2012 to 3/31/2013  
Team: S. Pamukcu (PI), Co-PI's: C. Naito and Li      Account: 542727  
Type: Competitive external grant

Title: "2012-2013 Lehigh University Faculty Grants for International Connections"

Agency: Lehigh U.      Amount: \$4,500      Period: 2012-2013  
PI: C. Naito      Type: Competitive LU grant

**Initiated in 2011 (\$215,909)**

Title: "Advancing Steel and Concrete Bridge Technology to Improve Infrastructure Performance"

Agency: U.S. Dept. of Transportation      Amount: \$2,759,924 (Total) \$105,938 (Naito)  
Period: 9/1/2011 to 8/31/2016      Team: R. Sause (PI), Co-PIs: D. Frangopol, C. Naito, S. Roy  
Account: 542621      Type: Competitive external grant

Title: "Structural Assessment of the Berks County Service Center"

Agency: Alfred Benesh & Company      Amount: \$49,000      Period: 9/1/2011 to 12/31/2011  
PI: C. Naito      Type: Competitive consulting grant

Title: "RAPID: Impact of Debris Generated from the 11 March 2011 Tohoku, Japan Tsunami (CMMI-1138668)"

Agency: NSF      Amount: \$40,971      Period: 7/1/2011 to 6/30/2013  
PI: C. Naito      Account: 542560      Type: Competitive external grant

Title: "Development of a Blast and Ballistic Resistant Precast Concrete Armored Wall System"

Agency: PCI      Amount: \$20,000      Period: 1/1/12 to 8/30/14  
PI: C. Naito      Account: 542474      Type: Competitive external grant

**Initiated in 2010 (\$636,863)**

Title: "PennDOT's Local Technical Assistance Program (LTAP)"

Agency: Pennsylvania Department of Transportation      Amount: \$75,467  
Period Covered: 12/1/2010 – 11/31/2013  
PI: C. Naito      Type: Competitive external grant

Title: "NEESR-CR: Impact Forces from Tsunami-Driven Debris (CMMI-1041666)"

Agency: National Science Foundation      Amount: \$963,111 (Total), \$286,396 (Lehigh)  
Period Covered: 9/15/2010 – 9/30/2013  
Team: H. R. Riggs (PI), Co-PIs: M. Kobayashi, C. Naito, D. Cox      Type: Competitive external grant

Title: "Collaborative Research: Development of a Blast and Ballistic Resistant Precast Concrete Armored Wall System (CMMI-1030812)"

Agency: National Science Foundation  
Amount: \$310,000 (Total) \$200,000 (Lehigh)      Period Covered: 8/15/2010 – 9/30/2013  
Team: C. Naito (PI), J. Davidson (Co-PI)      Type: Competitive external grant

Title: "Distributed Fiber-optic Sensing for Numerical Simulation of Shock wave Response of Manufactured Clay"

Agency: DOD – Department of Army      Amount: \$75,000      Period: 1/15/2010 – 1/14/2011  
Team: S. Pamukcu (PI), C. Naito (Co-PI)      Type: Competitive external grant

**Initiated in 2009 (\$106,313)**

Title: "Forensic Evaluation of Cracked Tie Plates and Field Testing"

Agency: Pennsylvania Department of Transportation      Amount: \$45,728      Period: 12/2009-7/2011  
PI: C. Naito      Type: Non-competitive external grant

Title: "Elastic Moduli and Poisson Ratio Determination for Rubberized Concrete,"

Agency: Air Force Research Lab      Amount: \$5,355 (526199 AT200.1)      Period: 11/2009-6/2010  
PI: C. Naito      Type: Non-competitive external grant

Title: "PennDOT Seismic Revisions to DM4 and Standards"

Agency: Pennsylvania Department of Transportation      Amount: \$35,230 (526905)      Period: 06/09-5/10  
PI: C. Naito      Type: Competitive external grant

Title: "Development of a Dry Chord Connection for Buildings in Moderate and High Seismic Regions,"

Agency: Precast/Prestressed Concrete Institute      Amount: \$20,000      Period: 9/09-6/10  
PI: C. Naito      Type: Competitive external grant

**Initiated in 2008 (\$52,423)**

Clay J. Naito, Ph.D., P.E.

Curriculum Vitae

Page 12 of 29

Title: "Blast Performance of Concrete Sandwich Wall Panels with Intermediate Supports and Connections"  
 Agency: Precast/Prestressed Concrete Institute Amount: \$20,000 Period: 9/08-6/09  
 PI: C. Naito Type: Competitive external grant

Title: "Evaluation of Unbonded Strand Reinforcement for Precast Concrete Floor Diaphragms"  
 Agency: PITA FY08 Amount: \$12,403 Period: 10/07-6/09  
 PI: C. Naito Type: Competitive LU grant

Title: "Research and Development of DUCON Blast Resistant Panels"  
 Agency: PITA FY08 Amount: \$20,020 Period: 10/07-6/09  
 PI: C. Naito Type: Competitive consulting grant

**Initiated in 2007 (\$447,506)**

Title: "Inspection Methods and Techniques to Determine Non Visible Corrosion of Prestressing Strands in Concrete Bridge Components"  
 Agency: PennDOT Amount: \$391,899.50 Period: 1/08-1/10  
 Team: C. Naito (PI), Co-PIs: S. Pessiki, R. Sause, and I. Hodgson Type: Competitive external grant

Title: "DCN/Turner – Triaxial Evaluation of Ducon Concrete"  
 Agency: EXCEND/Turner Amount: \$25,448 Period: 5/07-12/08  
 PI: C. Naito Type: Competitive consulting grant

Title: "DCN/Turner – Flexural Evaluation of Ducon Panels"  
 Agency: EXCEND/Turner Amount: \$30,158 Period: 5/07-12/08  
 PI: C. Naito Type: Competitive consulting grant

**Initiated in 2006 (\$275,858)**

Title: "Triaxial Testing of Concrete of 60MPa Self Compacting Concrete"  
 Agency: Daewoo Amount: \$25,897 Period: 10/1/06 – 11/30/06  
 Team: C. Naito (PI) Type: Competitive consulting grant

Title: "PITA VIII: Evaluation of Prestressing Methods for Carbon Fiber Reinforced Panels"  
 Agency: PITA Amount: \$34,517 Period: 9/01/04 – 6/30/06  
 Team: S. Pessiki (PI), C. Naito (Co-PI) Type: Competitive LU grant

Title: "Destructive Evaluation and Peer Review of Prestressed Box Beam Test Program for Beams from the Lake View Drive over I-70 and Related Prestressed Box Beams"  
 Agency: PennDOT Amount: \$107,444 Period: 3/13/06 – 8/31/06  
 Team: R. Sause (PI), C. Naito (Co-PI), S. Pessiki (Co-PI), and I. Hodgson  
 Type: Competitive external grant

Title: "Design Procedure for Precast Concrete Diaphragm System for High Seismic Zones"  
 Agency: Charles Pankow Foundation Amount: \$30,000 Period: 2 Year  
 Team: C. Naito (PI) Type: Competitive external grant

Title: "Development of a Welding Procedure Specification for Field Welding of Precast Concrete Connections"  
 Agency: Precast/Prestressed Concrete Institute (PCI) Amount: \$60,000  
 Period: 3/1/06 – 3/1/07 Team: R. Sause (PI), E. Kaufmann (Co-PI), and C. Naito (Co-PI)  
 Type: Competitive external grant

Title: "Horizontal Shear Tie Requirements for Composite Precast/Prestressed Construction"  
 Agency: PCI Amount: \$18,000  
 Period: 08/06-07/07 PI: Clay Naito  
 Type: Competitive external grant

**Initiated in 2005 (\$129,091)**

Title: "Feasibility Study of Microelectromechanical Devices For Use In Monitoring Concrete Strength"  
 Agency: PITA Amount: \$6,000 Period: 1 Year  
 Team: PI: C. Naito, Co-PI: Svetlana Tatic-Lucic (ECE) Fund: 541114  
 Type: Competitive LU grant

Title: "Research On Blast Resistance of Civil Infrastructure Components with Polyurea Coatings"  
 Agency: PITA / Air Products Amount: \$77,118 Period: 8/05-8/06  
 Team: C. Naito (PI), R. Sause (Co-PI) Fund: 541113/541080  
 Type: Competitive LU grant

Title: "Analytical Assessment of the Resistance of Precast Structures to Blast Effects"  
 Agency: PCI (Precast/Prestressed Concrete Institute) Amount: \$18,000  
 Period: 08/05-07/06 PI: Clay Naito Fund: 541055  
 Type: Competitive external grant

Title: "Blast Load Simulation"  
 Agency: PITA VIII Amount: \$27,973 Period: 1/05-3/06  
 Team: C. Naito (PI), R. Sause (Co-PI) Fund: 540936  
 Type: Competitive LU grant

**Initiated in 2004 (\$500,403)**

Title: "Development of Laboratory Equipment for Assessment of Blast Effects on Infrastructure"  
 Agency: Keystone Alliance Amount: \$25,000 Period: 3/04-6/05



PI: Quiel, S., Naito, C. (Co-PI)                      Status: Awarded  
 Title: "Innovation Corps Team Program: Innovative Insulated Wall Panel Connector"  
 Agency: NSF    Amount: \$50,000                      Period: 9/1/14-8/30/15  
 PI: Naito, C.    Status: Awarded  
 Title: Innovative Systems and Tools for the Design of Building Frames to Resist Progressive Collapse  
 Agency: Charles Pankow Foundation              Submission Date: 9/24/2014 (pre-proposal)  
 Funds Requested: \$297,530                      Type: Competitive external grant  
 Team: S. Quiel (Co-PI), C. Naito (Co-PI)                      Status: Declined  
 Title: "PCI Jenny Fellowship: Progressive Collapse Resistance of Precast Concrete Frames: Design Criteria and Connection Detailing"  
 Agency: Precast/Prestressed Concrete Industry  
 Amount: \$35,000                                      Period: 6/14  
 PI: Quiel, S., Naito, C. (Co-PI)                      Status: Awarded  
 Title: "2014 FIG: Progressive Collapse Resistance of Precast Concrete Frames: Design Criteria and Connection Detailing"  
 Agency: Lehigh University                      Amount: \$24,950                      Period: 8/14-7/15  
 PI: Quiel, S., Naito, C. (Co-PI)                      Status: Declined  
 Title: "Collaborative Research: GOALI: Development of a Simplified Design Procedure for Load-Bearing Precast Concrete Wall Panels Subject to Blast Loads"  
 Agency: NSF    Amount: \$314,467                      Period: 8/14-7/17  
 PI: Naito, C., Co-PIs: Davidson, J., Oswald, C.                      Status: Declined

**Submitted in 2013 (4 Submitted, 3 Declined, 1 Awarded, 0 Pending)**

Title: "Long-term Behavior of Geothermal Deep Foundation Systems in Cooling-Dominated Environments"  
 Agency: Qatar University                      Amount: \$309,125                      Period: 5/14-4/17  
 PI: Suleiman, M., Qatar P.I.: Al-khawajah, M., Co-PIs: Neti, S., Naito, C.(0.5mo) Status: Awarded (S00005728)  
 Title: "A Multipurpose, Large Open-Channel Facility at Fritz Lab for Undertaking the Next Generation of Fluid Dynamics/Hydraulics and Two-phase Flow Experiments"  
 Agency: Lehigh    Amount: \$200,000                      Period: 2014  
 PI: Diplas, P. Participants: Banerjee, Suleiman, Sause, Pazzaglia, Naito, Troy                      Status: Declined  
 Title: "Development of a Simplified Blast Design Procedure and Response Limits for Load-Bearing Precast Wall Panels Subject to Blast Loads"  
 Agency: PCI    Amount: \$300,000 (LU:\$64,835)                      Period: 9/2013 – 3/2016  
 PI: C. Oswald (PEC), Co-PI C. Naito (Lehigh), J. Davidson (Auburn)                      Status: Declined  
 Title: "Next-Generation Sustainable Construction: Buildings as Active Environmental Remediators"  
 Agency: CORE (Internal)                      Amount: \$60,000                      Period: 9/2013 – 8/2014  
 PI: J. Fox (Co-PI Nikolov, and Naito)                      Status: Declined

**Submitted in 2012 (3 Submitted, 2 Declined, 1 Awarded, 0 Pending)**

Title: "Bridge Deicing Using Geothermal Foundations"  
 Agency: PITA (S00004763)                      Amount: \$50,960                      Period: 1/1/13 to 1/30/2014  
 PI: M. Suleiman (Co-PI Naito, Frangopol and Neti)                      Status: Awarded  
 Title: "Guidelines for Shielding Bridge Piers"  
 Agency: NRC – Transportation Research Board (S00004936)                      Amount: \$450,000                      Submitted: March 2012  
 PI: P. Bocchini (Co-PI Naito, Suleiman)                      Status: Declined  
 Title: "Advanced Sensors for Body Armor Blunt Trauma Evaluation"  
 Agency: DoD – Department of the Army (S00005113)                      Amount: \$3,374,873                      Submitted: 7/1012  
 PI: C. Naito (Co-PI's Suleiman, Tatic-Lucic, Misilolek, Pamukcu, etc.)                      Status: Declined

**Submitted in 2011 (9 Submitted, 4 Declined, 5 Awarded, 0 Pending)**

Title: "Fiber-optic sensor Array to Determine Dynamic Projectile Interactions in Helmet Testing"  
 Agency: DOD (S00004763)                      Amount: \$93,880                      Period: 6/15/2012 to 3/31/2013  
 PI: S. Pamukcu (Co-PI Naito and Li)                      Status: Awarded (LU #: 542727)  
 Title: "Fatigue Strength of Welded Steel Connections under Out-of-Plane Displacement"  
 Agency: NSF (#1200666)                      Amount: \$178,433                      Period: 4/1/2012 to 3/31/2014  
 PI: C. Naito (Co-PI Hodgson and Yen)                      Status: Declined  
 Title: "Collaborative Research: Integrated Geothermal Energy System for Sustainable Bridge Infrastructure"  
 Agency: NSF    Amount: \$404,662                      Period: 4/1/2012 to 3/31/2015  
 PI: M.Sulieiman (Co-PI: Naito, Neti)                      Status: Declined  
 Title: "Structural Assessment of the Berks County Service Center"  
 Agency: Alfred Benesh & Company                      Amount: \$49,000                      Period: 9/1/2011 to 12/31/2011  
 PI: C. Naito    Status: Awarded  
 Title: "Advancing Steel and Concrete Bridge Technology to Improve Infrastructure Performance"  
 Agency: U.S. Dept. of Transportation              Amount: \$2,759,924                      Period: 9/1/2011 to 8/31/2016  
 PI: R. Sause, Co-PIs: D. Frangopol, C. Naito, S. Roy                      Status: Awarded (LU #: 542828)  
 Title: "Rapid Proposal to Assess Impact of Tsunami Generated Debris in Japan"  
 Agency: NSF    Amount: \$45,388                      Period: 5/11-1/12  
 PI: C. Naito    Status: Awarded (LU #: 542560)

Title: "Development of a Blast and Ballistic Resistant Precast Concrete Armored Wall System"  
 Agency: PCI Amount: \$20,000 Period: 1/12-1/13  
 PI: C. Naito Status: Awarded

Title: "Investigating Integrated Geothermal Deicing System for Extending Bridge Longevity"  
 Agency: National Cooperative Highway Research Program Amount: \$150,000 Submitted: 2/25/11  
 Period Covered: 9/1/2011 – 3/31/2013 PI: M. Suleiman Co-PIs: C. Naito, Daniel Sabatino  
 Status: Declined

Title: "Collaborative Research: Integrated Geothermal Energy System for Sustainable Bridge Infrastructure"  
 Agency: National Science Foundation (CMMI 1130400) Amount: \$313,986 Submitted: 2/15/11  
 Period Covered: 9/1/2011 – 8/31/2014 PI: M. Suleiman Co-PIs: C. Naito  
 Status: Declined

***Submitted in 2010 (8 Submitted, 5 Declined, 3 Awarded)***

Title: "Load Testing of Bridge Carrying SR 219 over Elk Creek, Ridgway, PA"  
 Agency: Pennsylvania Department of Transportation (ECMS) Amount: \$92,684 Submitted: 9/17/10  
 PI: C. Naito Status: Declined

Title: "Development of Ultra High Performance Concrete Energy Pile Foundations"  
 Agency: Pennsylvania Infrastructure and Technology Alliance Amount: \$31,761 Submitted: 9/10/10  
 PI: M. Sulieman Co-PI: C. Naito Status: Declined

Title: "PennDOT's Local Technical Assistance Program (LTAP)"  
 Agency: Pennsylvania Department of Transportation Amount: \$75,467 Submitted: 4/1/10  
 PI: C. Naito Status: Awarded

Title: "NEESR-CR: Impact Forces from Tsunami-Driven Debris"  
 Agency: National Science Foundation Amount: \$963,111 (Total), \$286,396 (Lehigh)  
 Period Covered: 9/15/2010 – 9/30/2013 PI: H. Ronald Riggs Co-PIs: M. Kobayashi, C. Naito, D. Cox  
 Status: Awarded

Title: "RAPID: Risk and Rehabilitation of Haitian Residential Construction"  
 Agency: National Science Foundation Amount: \$33,249 Period Covered: 4/1/2010 - 3/31/2011  
 PI: C. Naito Status: Declined

Title: "Collaborative Research: Development of a Blast and Ballistic Resistant Precast Concrete Armored Wall System"  
 Agency: National Science Foundation Amount: \$223,492 Period Covered: 6/1/2010 - 5/31/2013  
 PI: C. Naito Status: Awarded

Title: "Estimation of Dynamic Response of Non-Load Bearing Sandwich Wall Panels Subjected to Blast Demands"  
 Agency: Portland Cement Association Amount: \$20,000 Submitted: 1/15/10  
 PI: C. Naito Status: Declined

Title: "A Rational Concentrated Live Load Design Approach For Precast Concrete Double Tee Panels With Carbon Fiber Reinforcement"  
 Agency: PITA and High Concrete Amount: \$31,019 Period: 2/10-2/11  
 PI: C. Naito Status: Declined

***Submitted in 2009 (1 Submitted, 1 Declined) On Sabbatical***

Title: "Blast Collaborative Research: Development of a Design Methodology for Blast Resistant Energy Efficient Concrete Wall Panel Systems"  
 Agency: NSF Amount: \$211,589 Period: 6/09-5/12

***Submitted in 2008 (1 Submitted, 1 Awarded, 0 Declined) On Sabbatical***

Title: "Blast Performance of Concrete Sandwich Wall Panels with Intermediate Supports and Connections"  
 Agency: PCI Amount: \$20,000 Period: 1/08-1/10  
 PI: C. Naito Status: Awarded

***Submitted in 2007 (1 Submitted, 0 Pending, 1 Awarded, 0 Declined)***

Title: "Inspection Methods and Techniques to Determine Non Visible Corrosion of Prestressing Strands in Concrete Bridge Components"  
 Agency: PennDOT Amount: \$391,899.50 Period: 1/08-1/10  
 PI: C. Naito/ S. Pessiki/ R. Sause / I. Hodgson Status: Awarded

***Submitted in 2006 (4 Submitted, 0 Pending, 3 Awarded, 1 Declined)***

Title: "Daniel Jenny Fellowship: Horizontal Shear Tie Requirements for Composite Precast/Prestressed Construction"  
 Agency: PCI Amount: \$18,000 Period: 10/06-10/07  
 PI: C. Naito Status: Awarded

Title: "CAREER: Development of Blast Resistant Precast Concrete Panels Utilizing Polyurea"  
 Agency: National Science Foundation Amount: \$464,136 Period: 5 Year  
 Team: C. Naito (PI) Status: Declined

Title: "Destructive Evaluation and Peer Review of Prestressed Box Beam Test Program for Beams from the Lake View Drive over I-70"  
 Agency: PennDOT Amount: \$107,443.91 Period: 5 Months  
 Team: C. Naito, R. Sause, and S. Pessiki Status: Funded



Title: "Design Procedure for Precast Concrete Diaphragm System for High Seismic Zones"  
Agency: Charles Pankow Foundation      Amount: \$30,000      Period: 2 Year  
Team: C. Naito (PI)      Status: Funded

**Submitted in 2005 (10 Submitted, 0 Pending, 5 Awarded, 5 Declined)**

Title: "Development of a Welding Procedure Specification for Field Welding of Precast Concrete Connections"  
Agency: PCI      Amount: \$60,000      Period: 1 Year  
Team: R. Sause (PI), E. Kaufmann (Co-PI), and C. Naito (Co-PI)      Status: Funded

Title: "Fundamental Study to Optimize the Use of Polymeric Coatings as a Protective Armor Technology"  
Agency: Office of Naval Research      Amount: \$1,745,264      Period: 3 Years  
Team: Air Products and Chemicals, Inc. PI: Mark Conner, Co-PI: S. Kushner, M. Listemann  
Lehigh University PI: C. Naito, Co-PI: R. Sause, W. Misiolek, R. Pearson      Status: Declined

Title: "Research On Blast Resistance of Civil Infrastructure Components with Polyurea Coatings"  
Agency: PITA      Amount: \$77,118      Period: 1 Year  
Team: PI: C. Naito, Co-PI: R. Sause      Status: Funded

Title: "Feasibility Study of Microelectromechanical Devices For Use In Monitoring Concrete Strength"  
Agency: PITA      Amount: \$610,076      Period: 1 Year  
Team: PI: C. Naito, Co-PI: Svetlana Tatic-Lucic (ECE)      Status: Funded

Title: "NCHRP Project 12-74: Development of Precast Bent Cap Systems for Seismic Regions"  
Agency: Transportation Research Board      Amount: \$550,000      Period: 36 months  
Team: S. Pessiki (PI), C. Naito (Co-PI), R. Sause (Co-PI)      Status: Declined

Title: "Blast-Generated Column Boundary Force Effects on System Response and Potential for Progressive Collapse"  
Agency: NSF / CMS      Amount: \$452,078      Proposal: 510834  
Team: PI: C. Naito, Co-PI: R. Sause      Status: Declined

Title: "Examination of Horizontal Shear Tie Requirements for Composite Precast/Prestressed Construction"  
Agency: PITA      Amount: \$19,936      Period: 2005  
PI: C. Naito      Status: Awarded

Title: "Detailing Of Precast Spandrel Beams"  
Agency: Metromont Prestress Company      Amount: \$104,435      Period: 9/05-12/05  
Team: S. Pessiki (PI), C. Naito (Co-PI)      Status: Declined

Title: "Daniel Jenny Fellowship: Analytical Assessment of the Resistance of Precast Structures to Blast Effects"  
Agency: PCI      Amount: \$18,000      Period: 10/05-10/06  
PI: C. Naito      Status: Awarded

Title: "Daniel Jenny Fellowship: Horizontal Shear Tie Requirements for Composite Precast/Prestressed Construction"  
Agency: PCI      Amount: \$18,000      Period: 10/05-10/06  
PI: C. Naito      Status: Declined

**Submitted in 2004 (9 Submitted, 4 Awarded, 5 Declined)**

Title: "SIRG: Multi-purpose Wireless Sensor Networks for Civil Infrastructure"  
Agency: NSF / CMS (428603)      Amount: \$1,979,038      Period: 9/04-8/09      Status: Declined  
Team: L. Cheng (PI), R. Blum (Co-PI), R. Connor (Co-PI), C. Naito (Co-PI), E. Perevalov (Co-PI), R. Sause (Co-PI)

Title: "NEESR-Grand Challenge: Earthquake Protection for Building Systems"  
Agency: NSF/CMS      Amount: \$1,026,232      Period: 10/04-9/09  
C. Naito (PI)      Status: Declined

Title: "Upgrade of NEES Real-time Multidirectional Earthquake Simulation System to Enhance 3-D Testing Capabilities"  
Agency: NSF / CMS      Amount: \$68,487      Period: 10/04-9/05  
Team: Ricles (PI), C. Naito (Co-PI), S. Pamukcu (Co-PI), Y. Zhang (Co-PI), R. Sause (Co-PI)      Status: Awarded

Title: "NEESR-Grand Challenge: Transportation Network Seismic Risk Assessment and Damage Mitigation"  
Agency: NSF/CMS Via U.I.      Amount: \$1,150,000      Period: 7/04-6/09  
Team: Ricles (PI), C. Naito (Co-PI), R. Sause (Sr. Res. Personnel)      Status: Declined

Title: "Bond Performance of Precast Bulb Tee Girders with High Early Strength and Self Consolidated Concrete"  
Agency: PITA      Amount: \$75,849      Period: 4/04-6/05  
Agency 2: SPI (\$42,000), PCAP (\$2,500), PennDOT (\$18,900), Degussa (\$1000)  
Total Amount: \$140,249  
P.I. C. Naito      Status: Awarded

Title: "Development of Tri-Axial Testing Equipment for Concrete, Rock and Soil"  
Agency: PITA      Amount: \$82,623      Period: 1/04-6/05  
P.I. C. Naito      Status: Awarded

Title: "Development of Laboratory Equipment for Assessment of Blast Effects on Infrastructure"  
Agency: Keystone Alliance      Amount: \$25,000      Period: 3/04-6/04  
Team: C. Naito (PI), R. Sause (Co-PI)      Status: Awarded

Title: "Daniel Jenny Fellowship: Analytical Assessment of the Resistance of Precast Structures to Blast Effects"  
Agency: PCI      Amount: \$18,000      Period: 10/05-10/06  
PI: C. Naito      Status: Declined

Title: "Final Design Services for Structural Hardening Countermeasures"  
Agency: Delaware River Port Authority      Amount: NA      Period: 210 Days

PI: C. Naito

Status: Declined

**Submitted in 2003 (10 Submitted, 6 Awarded, 4 Declined)**

- Title: "Seismic Performance Simulation of Pile-Soil-Foundation Using Advanced Sensors and Real-Time Multi-Dimensional Testing"  
Agency: NSF / CMS (324610) Amount: \$499,600 Period: 8/03-7/06  
Team: S. Pamukcu (PI), C. Naito (Co-PI), L. Cheng (Co-PI), J. Ricles (Co-PI) Status: Declined
- Title: "REU Site: Summer Program for Research in Networked Earthquake Engineering"  
Agency: NSF / EEC (354029) Amount: \$218,777 Period: 1/04-1/07  
Team: S. Pamukcu (PI), C. Naito (Co-PI) Status: Declined
- Title: "CAREER: Development of Pseudo-Blast Evaluation Techniques for University Laboratories for Assessing the Resistance of Building Structures to Explosions"  
Agency: NSF / CMS (348063) Amount: \$570,689 Period: 2/04-1/09  
Team: C. Naito, PI Status: Declined
- Title: "Multi-Site Soil-Structure-Foundation Interaction Test (MISST)"  
Agency: NSF / CMS (407555) Amount: \$33,332 Period: 1/04-12-04  
Team: Ricles (PI), C. Naito (Co-PI), S. Pamukcu (Co-PI), Y. Zhang (Co-PI), R. Sause (Co-PI) Status: Awarded
- Title: "A Videogrammetric Sensor Network for Monitoring Real-Time Large-Scale Structural System Tests"  
Agency: NSF/CMS Amount: \$946,283 Period: 7/03-6/08  
Team: Y. Zhang (PI), C. Naito (Co-PI), S. Pamukcu (Co-PI), J. Ricles (Co-PI), G. Kessler (Co-PI) Status: Declined
- Title: "GOALI: Development of a Seismic Design Methodology for Precast Floor Diaphragms"  
Agency: NSF / CMS Via U.A. Amount: \$198,737 Period: 10/04-10/07  
Team: Lehigh U. – C. Naito (PI) & R. Sause (Co-PI) Status: Awarded
- Title: "Design Methodology for Precast Floor Diaphragms"  
Agency: Precast/stressed Concrete Inst. Amount: \$113,750 Period: 5/03-4/05  
Team: Lehigh U. – C. Naito (PI) & R. Sause (Co-PI) Status: Awarded
- Title: "A Wireless Sensor Network for Earthquake Response Monitoring"  
Agency: PITA Amount: \$33,858 Period: 06/04-06/05  
Team: L. Cheng (PI), C. Naito (Co-PI) Status: Awarded
- Title: "Development of Tri-Axial Testing Equipment for Concrete, Rock, and Soil"  
Agency: PITA Amount: \$82,623 Period: 06/04-06/05  
PI: C. Naito Status: Awarded
- Title: "JSPS Fellowship: Development of Pseudo-Dynamic and Hybrid Computational Algorithms for Seismic Performance Simulation of Concrete Structural Components"  
Agency: NSF/Japan Society for the Promotion of Science Period: 6/03  
PI: C. Naito Status: Awarded

**Submitted in 2002 (4 Submitted, 1 Awarded, 3 Declined)**

- Title: "Feasibility of Carbon Fiber Reinforced Polymer Built-Up I-Girders for Medium- Span Bridges"  
Agency: National Research Council Amount: \$100,000 Period: 01/01/03 – 12/31/03  
Team: Y. Zhang (PI), C. Naito (Co-PI), and J. Grenestedt (Co-PI) Status: Declined
- Title: "REU Site: Summer Program for Research of Large-Scale Structural Systems"  
Agency: National Science Foundation Amount: \$215,075 Period: 01/01/03 – 12/31/05  
Team: C. Naito (PI), R. Connor (Co-PI) Status: Declined
- Title: "CAREER: Development of Testing and Evaluation Methods of Blast Effects on Structures for University Laboratories"  
Agency: NSF / CMS Amount: \$441,931 Proposal: 238329  
Team: C. Naito, PI Status: Declined
- Title: "Real-time Multi-directional Testing Facility for Seismic Performance Simulation of Large-Scale Structural Systems"  
Agency: NSF / CMS Amount: \$2,593,317 Proposal: 217393  
Team: J. Ricles (PI), C. Naito (Co-PI), S. Pamukcu (Co-PI), Y. Zhang (Co-PI), R. Sause (Co-PI) Status: Awarded

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## Editorial Board

Associate Editor of American Society of Civil Engineering (ASCE) Journal of Bridge Engineering: 2010 – Present

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## Presentations and Chaired Sessions

### **Presentations at Major Conferences:**

1. Brewes, J., Naito, C., "Structural Integrity and Resilience of Precast and Prestressed Structures," ACI Fall Convention, Washington, DC, October, 2014.
2. Naito, C., "Background on Blast and Ballistic Effects on Buildings," Structural Engineering Association of Texas Annual Conference, (1PDH), Fort Worth, TX, October, 2014.
3. Naito, C., "Designing for Blast Demands Using Precast Concrete," Structural Engineering Association of Texas Annual Conference, (1PDH), Fort Worth, TX, October, 2014.

4. Sause, R., Ghosh, SK, Sennour, L., Frosch, R., Lien, J., and Naito, C., "Japan and New Zealand Earthquake: An Assessment of Precast Structures," 57<sup>th</sup> Annual PCI Convention, Salt Lake City, UT, October 2011.
5. Naito, C., "Diaphragm Design Methodology: Seismic Performance Evaluation and Effective Design of Precast Concrete Diaphragm Connections," 57<sup>th</sup> Annual PCI Convention, Salt Lake City, UT, October 2011.
6. Naito, C., "Activities of the ATLSS Research Center at Lehigh University," 57<sup>th</sup> Annual PCI Convention, Salt Lake City, UT, October 2011.
7. Naito C., Jones, L., "Non-Destructive Inspection of Strand Corrosion in Prestressed Concrete Box Beam Members," Invited Presentation, NDE/NDT for Highways and Bridges: Structural Materials Technology (SMT), New York, NY, August 2010.
8. Naito, C., "Blast Performance of Concrete Sandwich Panels with Intermediate Supports and Connections," Invited Presentation, 3<sup>rd</sup> International CEB/FIP Congress and Exhibition, Washington, DC, May 2010.
9. Naito, C., "Development of Specifications for Field Welding of Precast Connections," Invited Presentation, 3<sup>rd</sup> International CEB/FIP Congress and Exhibition, Washington, DC, May 2010.
10. Naito, C., "Design Limits for Precast Concrete Sandwich Walls Subjected to External Explosions," NASCC the steel conference / The Structures Congress, Orlando, FL, May 2010.
11. Naito, C., "Blast Performance Testing of Concrete Wall Systems," TCA Annual Convention, Invited Opening Seminar, Amelia Island, Florida, October 2009.
12. Naito, C., "Failure Modes and Inspection Methods for Non-Composite Adjacent Prestressed Concrete Box Beam Bridges, PCI National Bridge Conference," San Antonio, Texas, September 2009.
13. Dinan, R., Bewick, B., Hoemann, J., Davidson, J., Naito, C., Shull, J., "Performance of Energy Efficient Conventional Insulated Concrete Walls Under Blast Demands," 2009 USACE Infrastructure Systems Conference, Cleveland, OH, July 2009.
14. Naito, C., "Destructive and Non-Destructive Inspection Methods for Adjacent Prestressed Concrete Box Beam Bridges," 26<sup>th</sup> Annual International Bridge Conference, Pittsburgh, PA, June 2009.
15. Naito, C., "Expeditionary Structure Construction Method for Blast and Ballistic Protection," 13<sup>th</sup> International Symposium on the Interaction Effects of Munitions with Structures (ISIEMS), Bruhl, Germany, May 2009.
16. Naito, C., "Inspection Methods and Rehabilitation Measures for Prestressed Concrete Box Beam Bridges," New York State Department of Transportation 2009 Bridge Inspectors Meeting, Albany, New York, February 2009.
17. Naito, C., "Performance of Tilt-up and Precast/Prestressed Concrete Walls Subjected to External Explosions," Shock and Vibration Information Analysis Center (SAVIAC) 79<sup>th</sup> Annual Convention, Orlando, Florida, October 2008.
18. Naito, C., "Investigation of Environmental Conditions on Field Welding of Precast Concrete Connections, PCI Convention," R and D Session 31, Orlando, Florida, October 2008.
19. Naito, C., "Assessment of Precast Concrete Structures to Resist Blast Effects," ACI Spring 2008 Convention, March 2008.
20. Naito, C., "Development of Rational Design Methodology for Precast Concrete Diaphragms in Low and High Seismic Regions," ACI Spring 2008 Convention, March 2008.
21. Naito, C., "Use of Precast Concrete Walls for Blast Protection of Steel Stud Wall Construction," 2007 PCI Annual Convention, October 2007.
22. Naito, C., "Horizontal Shear Tie Requirements for Composite Precast/Prestressed Concrete Construction," 2007 PCI Annual Convention, October 2007.
23. Naito, C., "Development of Specifications for Field Welding of Precast Concrete Connections," 2007 PCI Annual Convention, October 2007.
24. Naito, C., "How to Predict the Resistance of Precast Concrete Wall Systems Subjected to Explosive Demands," Structural Engineers Building Conference and Expo, October 2007. Oral Presentation.
25. Naito, C., "Blast Resistance of Precast, Prestressed Concrete Building Wall Panels," PROTECT 2007 – Performance, Protection and Strengthening of Structures Under Extreme Loading, Whistler, Canada, Aug. 2007.
26. Naito, C., "Analytical Assessment of the Resistance of Precast Structures to Blast Effects," ACI Spring Convention, Atlanta, GA, April, 2007.
27. Naito, C., "Development of Design Methodology for Precast Concrete Diaphragms for Seismic Resistance," ACI Spring Convention, Atlanta, GA, April, 2007.
28. Naito, C., "Analytical Assessment of the Resistance of Precast Structures to Blast Effects," PCI Annual Convention, Grapevine, TX, Oct., 2006.

29. Naito, C., Fleischman, R., B., Restrepo, J., Sause, R., "Integrated Analytical and Experimental Approach to Precast Concrete Diaphragm Research Program," PCI Annual Convention, Grapevine, TX, Oct., 2006.
30. Naito, C., "Horizontal Shear Capacity of Composite Concrete Beams Without Ties," PCI Annual Convention, Grapevine, TX, Oct., 2006.
31. Naito, C., "Comparative Performance of Precast Bulb Tee Girders with High Early Strength Using Self Consolidating Concrete," PCI National Convention, Atlanta, GA, Oct., 2004.
32. C. Naito, , "Applicability of Self Consolidating Concrete for Use in Precast Bridge Beam Construction," Fourth International RILEM Symposium on Self-Compacting Concrete, Oct-Nov, 2005, Chicago, Illinois
33. Naito, C., Fleischman, R., B., Restrepo, J., Sause, R., "Integrated Analytical and Experimental Approach to Precast Concrete Diaphragm Research Program," PCI National Convention, Atlanta, GA, Oct., 2004.
34. Naito, C., "Presentation: A NEES-Based Research Project," NSF NEES Informational Meeting and Webcast NEES Seminar, National Center for Supercomputing Applications, University of Illinois, Nov. 6, 2003.
35. Naito, C., "Precast Diaphragm Panel Joint Connector Test Program," PCI Parking Structure Committee Meeting, PCI National Convention, Oct., 2003.

***Invited Presentations at Universities:***

1. Naito, C., "Inspection Methods & Techniques to Determine Non-Visible Corrosion of Prestressing Strands in Concrete Bridge Components," Invited Seminar, Politecnico di Milano, Milan, Italy, July 4, 2013.
2. Naito, C., "Design for Disproportionate Collapse Prevention of Precast and Prestressed Concrete Structures," Invited Seminar, Università degli Studi di Napoli Federico II, Naples, Italy, July 3, 2013.
3. Naito, C., "Development of a Blast and Ballistic Resistant Insulated Wall Panel System," Invited Seminar, National Technical University of Athens, School Of Civil Engineering, Dept. of Structural Engineering, Athens, Greece, July 1, 2013.
4. Naito, C., "Water-Driven Debris Impact Forces on Structures: Experimental and Theoretical Program," Invited Seminar, Sapienza Università di Roma, Rome, Italy, June 25, 2013.
5. Naito, C., "Precast Construction and Multi-Hazard Design," Colorado State University, Fort Collins, December 2010.
6. Naito, C., "Bridge Design Basics," University of Science and Technology, Beijing, China, July, 2010.
7. Naito, C., "Faculty Perspectives on Lehigh's Distinctive Teaching and Learning Culture Presentation and Lecture," Lehigh University, Apr., 2005.
8. Naito, C., "Accuracy and Improvements for Variable and Constant Confinement Concrete Models," Zhejiang University, Hangzhou, China, June, 2004.
9. Naito, C., "Real-Time Multi Directional Testing Facility for Large-Scale Earthquake Engineering Research" Kyoto University, Disaster Prevention Research Institute, June 24, 2003.
10. Naito, C., FERS Seminar: "Seismic Performance of Woodframe Structures," ATLSS Center Lehigh University, Jan. 29, 2003.

***Presentations at Industries, Workshops, or Minor Conferences:***

1. Naito, C., "PCMA Seminar Designing for BLAST using Prestressed Precast Concrete Structures," (4 PDH) 4 hour seminar for members of the Precast Concrete Manufacturers Association of Texas, Houston, TX, October, 2014.
2. Naito, C., "Blast Protection with Precast Wall Panels," Precast/Prestressed Concrete Institute Lunch Seminar, June, 2012, Chicago IL.
3. Naito, C., "Precast Construction Systems in the United States and Seismic Design Methodology of Precast Concrete Diaphragms," July 2010. Presentations at Shanghai Institute of Architectural Design and Research / Beijing Building Construction Research Institute / Beijing YUGOU Co., Ltd. - Concrete Precast Plant, China.
4. Naito, C., "Overview of Masonry and Precast Concrete Panel Research Programs," UFC 3-340-02 Technical Working Group Meeting, Department of Defense Explosive Safety Board, May 19, 2009, Alexandria, VA.
5. Naito, C., "Prestressed Self-Consolidating Concrete Girders," Session IV, Self-Consolidating and High-Performance Concrete Workshop, Department of Civil and Environmental Engineering, Rutgers, The State University of New Jersey, Oct., 2006.
6. Naito, C., "Performance of Architectural Wall Panels Under Blast Loads," PCI Blast Committee Meeting, PCI Committee Days, Chicago, April, 2006.
7. Naito, C., "SCC Test Results and Strand Bond," Seventh Annual Pennsylvania Concrete Conference, American Concrete Pavement Association, Harrisburg, PA, Jan., 2006.
8. Naito, C., "Self Consolidating Concrete – Bridge Beams," 38<sup>th</sup> Mid-Atlantic Quality Assurance Workshop, PennDOT, Carlisle, PA, Feb., 2005.

9. Naito, C., "Self Consolidating Concrete," Sixth Annual Pennsylvania Concrete Conference, American Concrete Pavement Association, Harrisburg, PA, Jan., 2005.
10. Naito, C., "Research Overview - Performance of Precast Bulb Tee Girders with High Early Strength and Self Consolidating Concrete," Mid-Atlantic States Prestressed Concrete Committee for Economic Fabrication (PCEF) General Meeting, Pottsville, PA, Oct., 2004.
11. Workshop Organizer, "SCC Beam Research Project Open House, Lehigh University, July, 2004. The goal of the workshop was to expose regional transportation authorities to the benefits self consolidating concrete in bridge construction. The workshop was well attended with over 40 participants. The attendees included representatives from the Federal Highway Administration, and the New York, New Jersey, Pennsylvania, Maryland, and Delaware Departments of Transportation.
12. Naito, C., "Preliminary Results From Lehigh University Research Program on SCC," SCC Fabrication Workshop, Schuylkill Products, Inc., Cressona, PA, April, 2004.
13. Naito, C., "Hardening of Load Bearing Shear Wall Structures," Structural Engineers Association of Hawaii, General Meeting, Honolulu, HI, June 2004.
14. Naito, C., "Living and Doing Research in Japan," East Asia Summer Institute Orientation, National Science Foundation, Washington, D.C., May 2003.

**Chaired Sessions at Major Conferences:**

1. Session Co-Chair, Session BT310 Progressive Collapse and Structural Robustness: An International Perspective, ASCE/SEI Structures Congress, Pittsburgh, PA, May 2013.
2. Session Chair, Session: Innovation and Creative Solutions Part 2, 57<sup>th</sup> Annual PCI Convention, Salt Lake City, UT, October 2011.
3. Session Chair, Session: Advances in NDT/NDE Analysis, NDE/NDT for Highways and Bridges: Structural Materials Technology (SMT), New York, NY, August 2010.
4. Session Chair, Session #10 Blast and Fire, PROTECT 2007 – Performance, Protection and Strengthening of Structures Under Extreme Loading, Whistler, Canada, Aug. 2007
5. Session Chair, Session #7 FRP, International Symposium on Confined Concrete, Changsha, China, June, 2004.
6. Co-chair at the 7<sup>th</sup> National Conference on Earthquake Engineering, Session ST-14 (Structures), Boston, MA, July 2002

**Teaching Experience**

- Ten courses taught, six newly developed.

Term		Description	Credits	Students	Student Evaluation (out of 5.0)	
					Teaching effectiveness	Quality of course
Spr.	2002	CEE 160-Structural Design	2	29	3.37	3.44
Fall	2002	CEE 159-Structural Analysis 1	4	31	3.65	4.12
Spr.	2003	CEE 266 – Project Management*	3	23	3.68	3.68
Spr.	2003	CEE 281 – Special Topics	3	4	3.67	3.00
Fall	2003	CEE 159 – Structural Analysis 1	4	26	4.04	4.04
Fall	2003	*Eng 5 – Intro. to Eng. Practice*	1	25	4.33	4.33
Spr.	2004	CEE 266 – Constr. Management	3	36	4.00	3.84
Spr.	2004	Eng 5 – Intro. to Eng. Practice	1	22	NA	NA
Fall	2004	CEE 159 – Structural Analysis 1	4	40	3.97	3.94
Fall	2004	Eng 5 – Intro. to Eng. Practice	1	24	NA	NA
Spr.	2005	CEE 266 – Constr. Management	3	30	3.68	3.52
Spr.	2005	Eng 5 – Intro. to Eng. Practice	1	20	4.27	4.10
Fall	2005	CEE 159 – Structural Analysis 1	4	21	3.95	4.29
Fall	2005	CEE 159 – Structural Analysis 1	4	25	4.06	4.17
Spr.	2006	*CEE 467 – Repair and Retrofit*	3	10	3.80	3.90
Spr.	2006	*CEE 290 – Capstone Design*	3	26	3.17	3.08
Fall	2006	CEE 365 – Prestressed Concrete	3	27	3.89	4.04
Spr.	2007	Mech 12 – Strength of Materials	3	23	4.62	4.38

Term		Description	Credits	Students	Student Evaluation (out of 5.0)	
					Teaching effectiveness	Quality of course
Spr.	2007	CE 290 – Capstone Design	3	26	3.42	3.44
Fall	2007	CEE 365 – Prestressed Concrete	3	19	4.53	4.63
Spr.	2008	Mech 12 – Strength of Materials	3	30	4.88	4.50
Spr.	2008	CEE 290 – Capstone Design	3	22	3.82	4.09
2008 – 2009		On Sabbatical				
Fall	2009	CEE365 – Prestressed Concrete	3	41	4.14	4.33
Fall	2009	CEE159 – Structural Analysis 1	4	41	4.21	4.21
Spr.	2010	Mech 12 – Strength of Materials	3	29	4.08	4.12
Fall	2010	CEE 365 – Prestressed Concrete	3	32	3.70	4.07
Fall	2010	*CEE457 –Blast Resistant Design*	3	30	4.14	4.00
Spr.	2011	Mech 12 – Strength of Materials	3	17	4.60	4.67
Fall	2011	CEE 365 – Prestressed Concrete	3	30	4.04	4.24
Spr.	2012	CEE 457 –Blast Resistant Design	3	19	4.42	4.42
Fall	2012	CEE 365 – Prestressed Concrete	3	36	4.48	4.66
Fall	2013	CEE 365 – Prestressed Concrete	3	34	4.62	4.58
Fall	2013	*CEE 123 – CEE Materials*	3	35	3.61	3.50
Spr.	2015	CEE 457 –Blast Resistant Design	3	22	TBD	TBD

\* New course developed.

#### ***Engineering 5 Introduction to Engineering Practice (3 credits) – Fall 2003 & 2004 – Spring 2004 & 2005***

I developed this course to provide a practical engineering project for entering freshmen students. The project focused on the design, testing, and evaluation of balsa wood bridges. The format was a mixture of lecture, construction, and computer laboratories. The entire engineering process is covered: concept development of bridge configurations, preliminary design of multiple options, detailed design of the most promising design, material procurement, construction, load testing, and failure analysis. The students compete in groups to design the most efficient bridge that can support the weight of the professor. If the design passes the “dead” load test then the bridge is loaded to failure in a load frame. The designs are evaluated post-test to identify any deficiencies.

#### ***CEE 123 Civil Engineering Materials (3 credits) – Fall 2013***

This newly developed required junior level course that covers the basics of civil engineering materials. The course includes properties of concrete, mortar, grout steel, and wood materials and is taught through two 50-min classes and one lab per week. Eleven materials laboratories were developed to cover the topics discussed. The course replaces a previous 1-credit version of the course.

#### ***CEE 159 Structural Analysis (4 credits) – Fall 2002 – 2003 – 2004 – 2005 – 2009***

This required junior level course covers the basics of structural analysis. The course includes elastic analysis of statically determinate beams, frames, and trusses; deflections by the methods of virtual work and moment area; influence lines for determinate structures; modeling for structural analysis; flexibility, stiffness, and approximate methods of analysis for indeterminate structures.

#### ***CEE 160 Structural Design (4 credits) – Spring 2002***

This junior level course was the first course in structural design at Lehigh University. The course applies the basic principles of structural mechanics (equilibrium, material law, compatibility) to check that a reinforced concrete beam or column has sufficient safety against flexural failure due to overloads and under-strengths, does not exceed the serviceability limit states of maximum crack width and maximum deflection, has sufficient safety against shear failure or combined flexure and axial compression due to overloads and under-strengths. This course is no longer taught and has been divided into two separate courses.

#### ***CEE 266 Project/Construction Management (3 credits) – Spring 2003 – 2004 – 2005***

This elective junior/senior level course provides an overview of the construction process with an emphasis on the issues involved with management of complex construction project. To improve the learning experience a number of field trips to local construction projects and guest lectures by construction managers from industry are incorporated.

### ***CEE 281 Independent Study (3 credit) – Spring 2003***

This independent study course was developed for seniors who are interested in further studies in construction. In the spring of 2003, four students are participating in the course. The course revolves around the development of a new graduate student housing for Lehigh University. Site layout, estimation, scheduling, and cost benefit evaluation is incorporated.

### ***CEE 290 Capstone Design (3 credit) – Spring 2006 – 2007 – 2008***

The course is a guided senior capstone design project with an emphasis on structural and geotechnical engineering. I developed this course with the goal of providing a realistic engineering experience by integrating basic material learned during the Lehigh University civil engineering undergraduate program to address a real-life design problem at the feasibility level. The scope includes needs analysis, formulation of the design problem statement and evaluative criteria; analysis of alternative solutions and the generation of specifications. Economic, social, environmental, aesthetic and safety constraints are considered.

### ***CEE 365 Prestressed Concrete Design (3 credits) – Fall 2006 – 2007 – 2009 – 2010 – 2011 – 2012 – 2013***

The elective course is geared for seniors and graduate students. The course covers the principles of prestressing concrete. Analysis and design of basic flexural members, instantaneous and time-dependent properties of materials, prestress losses are discussed in detail. Additional topics include continuity, partial prestressing, compression members, torsion, and circular prestressing. A design competition has been integrated into the course. The best group design is built and load tested to assess the accuracy of analysis methods.

### ***CEE 467-43 Advanced Topics – Repair and Retrofit of Reinforced Concrete Structures (3 credits) – Spring 2006***

I developed this graduate course on the rehabilitation of reinforced concrete structures for blast and seismic resistance. The course covers the evaluation of condition, strength, serviceability, and ductility of existing structures; criteria for rehabilitation; retrofit techniques for change in function, loading, blast and seismic forces; causes of distress, evaluation methods, repair materials, repair techniques, and quality control methods for repair. This course supplements the existing course catalog and provides an additional exposure to advanced design concepts which our graduate students will likely face as design engineers.

### ***CEE 457 – Behavior and Design of Blast Resistant Structures (3 credits) – Fall 2010 – Spring 2012 – 2015***

An overview of structural response and behavior under blast demands generated from accidental or intentional detonation of high explosives. The course focuses on the determination of blast demands and characterization of pressures on structural systems and components, evaluation of system response, modeling structural components, dynamic time history analysis, allowable response limits for structural systems, stand-off requirements for facilities, close-in detonations and current response limits used in US design.

### ***Mech 12 Strength of Materials (3 credits) – Spring 2007 – 2008 – 2010***

To assist the Mechanical Engineering and Mechanics Department I taught one section of the course. The course covers transverse shear in beams, Mohr's circle for stress, plastic yield criteria, deflection of beams, introduction to numerical analysis of simple structures, fatigue and fracture, column buckling, and stresses in thick-walled cylinders.

## **Outreach**

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- NSF Science Nation, “Engineers re-create tsunami debris impacts to measure their force” ([http://www.nsf.gov/news/special\\_reports/science\\_nation/tsunamitests.jsp](http://www.nsf.gov/news/special_reports/science_nation/tsunamitests.jsp)) video: [http://youtu.be/kpumUf5A\\_A](http://youtu.be/kpumUf5A_A) , Posted March 24, 2014. Weather Channel edit (<http://www.weather.com/video/the-power-of-tsunami-debris-46093?collid=/news/top-stories>).
- Discovery Canada, “Daily Planet: Cargo Crate Testing,” Video Interview, (<http://watch.discoverychannel.ca/#clip903741>), Aired January 22, 2013.
- Discovery Canada, “Daily Planet: Tsunami One Year Later Special – Japan Tsunami Part 1,” (<http://watch.discoverychannel.ca/clip686530#clip686530>), Aired March 9, 2012.
- Garish, T., “Researching the impact of tsunami-driven debris,” The Inquirer, Philadelphia, PA, Video Interview, (<http://www.philly.com/philly/video/141769463.html>), Posted March 7, 2012.
- Avril, T., “Gravity of disaster registers with U.S. scientists,” The Inquirer, Philadelphia, PA, Newspaper Article, ([http://articles.philly.com/2011-03-13/news/28686099\\_1\\_tsunami-japan-earthquake-associate-professor](http://articles.philly.com/2011-03-13/news/28686099_1_tsunami-japan-earthquake-associate-professor)), Posted March 13, 2011.
- Precast/Prestressed Concrete Institute, “Blast Design of Reinforced Concrete,” Air Force Research Lab, Tyndall Air Force Base, Panama City, FL, Video Production of Blast Test Series, ([http://www.pci.org/design\\_resources/building\\_engineering\\_resources/design\\_for\\_blast\\_resistance/](http://www.pci.org/design_resources/building_engineering_resources/design_for_blast_resistance/)).

- Research Recognition Article: Cole, M., Photos by Brown, D., “Universities, Students Seizing Ground Floor Opportunities,” MC: A Magazine for the Manufactured Concrete Industry, July/August 2005, pp. 52-55.
- Teaching Recognition Article: Pfizer, K., “Getting the hang of bridge-building,” Lehigh University News Article, Posted November 16, 2004.

## **Student Advising**

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### ***Doctor of Philosophy (6 Completed, 3 in Progress)***

1. Patrick Trasborg (Summer 2014) – Topic: Development of a Blast and Ballistic Resistant Wall System, Employment: Skidmore Owings and Merrill, New York, NY.
2. Payam Piran Aghl (Summer 2014) – Topic: Impact Forces from Tsunami-Driven Debris, Employment: WSP, New York, NY.
3. Joseph Jordan (Co-advisor J. Kazakia) (Fall 2012) – Topic: Fragment Simulators for the 21st Century, Employment: US Army Corp ERDC, Vicksburg, MS.
4. Ruirui Ren (Summer 2011) – Topic: Performance of Precast Diaphragm Connections. Employment: Ericksen Roed & Associates, St. Paul, MN.
5. Liling Cao (Fall 2006) – Effective Design of Precast Concrete Diaphragm Connections Subjected to In-Plane Demands, Ph.D. Dissertation. Employment: Thornton Tomasetti, Philadelphia.
6. Fatih Cetisli (Fall 2006) – A Predictive Methodology For Estimating the Axial Response of Confined Concrete, Ph.D. Dissertation. Employment: Assistant Professor Department of Civil Engineering, Firat University, Elazig, Turkey.
7. Christina Cercone (*Expected Spring 2015*) – Topic: Designing and Detailing Post Tensioned Bridges to Accommodate Non-Destructive Evaluation (NDE)
8. Omar Alawad – (*Expected Spring 2018*) – Sensitivity of Residential Construction to Accidental Detonation of Natural Gas Pipelines.
9. Corey Fallon (*Expected: Spring 2018*) – Robustness of Precast Concrete Structures Subject to Progressive Collapse, Co-Advised with S. Quiel.

### ***Master of Science (21 Completed, 1 in Progress)***

1. Corey Fallon (Spring 2015) – Robustness of Precast Concrete Structures Subject to Progressive Collapse. Co-Advised with S. Quiel.
2. Omar Alawad – (Summer 2014) – Sensitivity of Residential Construction to Accidental Detonation of Natural Gas Pipelines.
3. Xiang Li (Spring 2012) – Topic: Fatigue Failure Evaluation of Tie Plates due to Secondary Deformations on Steel Plate Girder Bridges. Employment: Dmar Engineering Consulting, Houston TX.
4. Feng Shi (Summer 2011) – Topic: Progressive collapse requirements for precast concrete building systems. Employment: China
5. Patrick Trasborg (Summer 2011) Topic: Development of a Blast and Ballistic Resistant Precast Concrete Armored Wall System.
6. Joseph States (Spring 2011) – Topic: Use of Crumb Rubber Concrete for Blast Protection of Buildings. Employment: GAI Consultants, Inc.
7. Tim Cullen (Spring 2011) – Topic: Evaluation Of Unbonded Strand Reinforcement For Precast Concrete Floor Diaphragms. Employment: Blue Ridge Design.
8. Mark Beacraft (Fall 2010) – Topic: Blast Performance Of Precast Concrete Sandwich Wall Panels
9. Jessica Shelala (Fall 2010) – Topic: Proposed Precast Concrete Bridge Deck System with Carbon Fiber Grid Reinforcement. Co-Advised with S. Pessiki.
10. Lawrence Jones (Spring 2010) – Topic: Inspection Methods & Techniques to Determine Non Visible Corrosion of Prestressing Strands in Concrete Bridge Components. Employment: NASA
11. Clifford Jones (Fall 2009) – Topic: Performance of DUCON Blast Resistant Panels. Employment: Protection Engineering Consultants, Texas.
12. Jonathan Kovach (Summer 2008) – Topic: Horizontal Shear Capacity of Composite Concrete Beams Without Ties. Employment: WJE, Cleveland OH
13. Jason Zimpfer (Summer 2007) – Topic: Development of a Welding Procedure Specification for Field Welding of Precast Concrete Connections. Co-Advised with R. Sause. Employment: AECOM, Philadelphia
14. Lynne Starek (Summer 2007) – Topic: Blast Resistance of Civil Infrastructure Components with Polyurea Coatings. Employment: Hinman and Associates.
15. Joe Creek (Fall 2006) – Topic: Performance of Enhanced Connectors for Double Tee Panels.
16. Nicholas Cramsey (Fall 2006) – Topic: Analytical Assessment of the Resistance of Precast Structures to Blast Effects. Employment: Simpson, Gumpertz, and Heger, Waltham, MA.



17. Tyler Tate (Spring 2005) – Topic: Evaluation of Bond Mechanics in Prestressed Concrete Applications. Employment: President at Lewis Contractors.
18. Katie Payne Wheaton (Spring 2005) – Topic: Blast Assessment of Load Bearing Reinforced Concrete Shear Walls. Employment: Osborn Engineering, Cleveland, OH
19. Greg Parent (Fall 2005) – Topic: Comparative Performance of High Early Strength and Self Consolidating Concrete for Use in Precast Bridge Beam Construction. Employment: Martin & Martin, Lakewood, CO.
20. Wesley Peter (Fall 2005) – Topic: Performance of Precast Diaphragm Connectors. Employment: SK&A Consulting Structural Engineers, Washington, D.C.
21. Fatih Cetisli (Spring 2004) – Topic: Accuracy and Improvements for Variable and Constant Confinement Concrete Models.
22. Matt Gombeda (Spring 2016) – Topic: Threat Dependent Progressive Collapse Evaluation Methods. Co-Advised with S. Quiel.

***Master of Engineering (2 Completed)***

1. Elizabeth Andrews (Spring 2004) – Topic: Rigid and Flexible Diaphragms of Wood Frame Structures.
2. Tom Gentis (Spring 2006) – Topic: Effect of Weathering on the Shear Capacity of Nailed Wood Sheathing.

***Other Graduate Research Advisees***

1. Matt Walsh (CEE 491 Spring 2004) – Topic: Horizontal Shear Capacity of Composite Concrete Beams Without Ties Literature Review and Test Program.
2. Linda Kaplan (CEE 481 Spring 2010) – Topic: Blast Protection of Steel Stud Wall Building Systems.

***Undergraduate Research Advisees (14 Completed)***

1. Monique C. Hite, B.S., University of Delaware (UC Berkeley SUPERB program 2000).
2. Ryan Petersen, B.S. Texas A&M University (NSF REU program at UC Berkeley 2001).
3. Rita Rodriguez-Vera, B.S., University of Puerto Rico, Mayagüez (UC Berkeley SUPERB program 2001)Justin McCarthy, B.S. Lehigh University – Summer REU internship at Lehigh 2002.
5. Fyiad Constantine, B.S. Morgan State University – Summer REU internship at Lehigh 2002.
6. Mel Oxenreider (CE 281, Spring 2004) – Topic: Weathering Effects on the Behavior of Nailed Wood Panels Subjected to Shear.
7. Geoffrey Brunn (CE 211, Spring 2005) – Topic: Material Evaluation of Self Consolidating Concrete for Use in Prestressed Bridge Beam Construction, (*Winner of the 2005 P.C. Rossin College of Engineering Undergraduate Research Symposium*).
8. Jamie Dirici (CE 211 Fall 2005) – Topic: Feasibility Study of Microelectromechanical Devices for Use in Monitoring Concrete Strength.
9. Dean Deschenes (CE 281 Fall 2005) – Topic: Horizontal Shear Capacity of Composite Concrete Beams Without Ties. Graduate School: UT Austin.
10. Anthony Batistini (CE 211 Spring 2006) – Topic: Development of a Welding Procedure for Field Welding of Precast Concrete Connections. (Richard Sause – Co-Advisor)
11. Bryan Beckner (CE 281 Fall 2006) – Topic: Evaluation of JVI Vector Connector Under In-plane Demands.
12. Tim Cullen (CE 211(2) Spring 2007) – Topic: Chord Connectors Under In-plane Demands.
13. Cliff Jones (CE 211(2) Spring 2007) – Topic: Evaluation of Shear Connectors Under In-plane Demands.
14. Mithun Patel (CE 211(2) Fall 2007 CRN 41567) – Topic: Development of Polyurea Fibers.
15. Robert Asselin (CEE 281(1) Fall 2010) – Topic: Design of the Chinese Rainbow Bridge.

***Doctoral Dissertation Committee Member / Administrative Chair***

1. Suguang Xiao – Dissertation: Geothermal Pile for Bridge Deicing and its Thermal-Mechanical Response. Dissertation Advisor: MT Suleiman, Committee Members: Clay Naito, Sibel Pamukcu, Mesut Pervizpour, Sudhakar Neti, Sept 2011 – Dec 2015 estimated.
2. Thomas Hai Lin – Dissertation: Microbial Modification of Soil for Ground Improvement. Dissertation Advisor: MT Suleiman, Committee Members: Sibel Pamukcu (Chair), Muhannad T. Suleiman (Advisor), Derick G. Brown (Co-Advisor), Clay J. Naito (Internal member), Amy H. Camp (External member), Jeffery Helm (External member). Aug 2010 – Sept 2015 Estimated.
3. Jie Liu – Dissertation Topic: Performance Indicators of Highway Bridges and Bridge Networks under Extreme Events. Dissertation Advisor: Frangopol, Committee Members: Ben Yen, Liang Cheng, Muhannad Suleiman, Clay Naito (chair) (Aug 2009 – May 2015 Estimated).
4. Golnaz Shahidi – Dissertation: Response Surface Method for Finite Element Model Updating, Dissertation Advisor: Shamim Pakzad, Committee Members: D. Frangopol, L. Lai (outside), J. Wilson, C. Naito (chair) Dec.2011 – May 2015 estimated.

5. Lusu Ni – Dissertation Advisor: Muhannad Suleiman. Topic: Development and Investigation of Pervious Concrete Ground Improvement Technique. Committee Members: Pamukcu (chair), Naito, Pervizpour, Riach. Completed August 2014.
6. Duygu Saydam – Committee Member, Dissertation: Life-cycle performance based design, assessment and maintenance optimization of structural systems under progressive damage and abnormal events: Application to highway bridges, naval ships and highway bridge networks, Advisor: Frangopol, Completed May 2013.
7. Mohamed Soliman (Lehigh University – Jan. 2010 to Dec 2012 Expected) Advisor: Prof. Frangopol, Dissertation: Life-cycle system-reliability based management of structures integrating the effects of fatigue, corrosion, man-made and natural hazards.
8. Dichuan Zhang (University of Arizona May 2010) – Dissertation: Examination Of Precast Concrete Diaphragm Seismic Response By Three-Dimensional Nonlinear Transient Dynamic Analyses (Advisor Prof. R. Fleischman)
9. Nader Okasha (Lehigh University May 2010) Dissertation: Integration of System-Based Performance Measures and Structural Health Monitoring for Optimized Structural Management Under Uncertainty (Advisor Prof. D. Frangopol)
10. Zhuo Fan: (May 2007) Committee Chair
11. Oya Mercan (Lehigh May 2007) – Advisor: J. Ricles
12. Cheng Chen (Lehigh July 2007) – Advisor: J. Ricles
13. Michael McGinnis: (May 2006) Committee Chair
14. Didem Ozevin: (Summer 2005) Committee Chair

#### ***Other Undergraduate Advisees***

1. Geoffrey Brunn (CE 205, Spring 2007) – Topic: Innovative Display Board Development Project.
2. Tim Cullen, Cliff Jones, Tanya Wulf (CEE 205, Spring 2007) – Topic: 2007 PCI Big Beam Competition

#### **Notable Student Extra-Curricular Advising**

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- 2013 Precast/Prestressed Concrete Institute Big Beam Competition Advisor to Lehigh Team: 2013 National Champions. Team won national competition for developing the most cost effective design and accurate estimate of strength and deflection of an 18 ft. prestressed beam.
- 2013, 2014 Bridges to Prosperity (B2P) Lehigh Chapter Advisor. Initiated new student club chapter at Lehigh University. 2013 team designed and built a bridge in Panama. 2014 is in progress for another bridge site in Panama.
- 2008 – 2013: PCI Big Beam Advisor for Lehigh University. Two team entries for 2008, 2010, 2011, 2012, 2013. 1<sup>st</sup> or second at regional level for each year.
- 2009 Advisor for ASCE Student Steel Bridge Design Team. Competed at regional competition of ASCE Steel Bridge.
- Spring 2005 – Geoffrey Brunn (Undergraduate Advisee) – Winner of the 2005 P.C. Rossin College of Engineering Undergraduate Research Symposium – Topic: Material Evaluation of Self Consolidating Concrete for Use in Prestressed Bridge Beam Construction.
- 2002-2009 Faculty Advisor ASCE Lehigh U. Student Chapter
- Summer REU Advising. Organized and managed a summer research experience for undergraduate program at the Lehigh University ATLSS Center.
  - 6/2002 – 9/2002: 2002 Summer Research Experience for Undergraduates at the ATLSS center – 5 Students
  - 6/2003– 9/2003: 2003 Summer Research Experience for Undergraduates at the ATLSS center – 6 Students

#### **Service Activities**

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##### ***University Service***

- Faculty Search Committee – Architectural Design and Building Technology: 2007 – 2008.
- Lehigh Advisor China Study Abroad Program and China Bridge Program: Summer 2010
- Spring Commencement 2002, 2003, 2013.
- Faculty Advisor Hawaiian Culture Appreciation Club (Spring 2008)
- Faculty Advisor Lehigh Cycling Club (2007-2009, 2014)

##### ***College Service***

- RCEAS Academic Policy Committee 2012 through 2016
- RCEAS College of Engineering Tenure Committee 2009 – 2015

- First Year Engineering Task Force Committee Fall 2009 – Spring 2010
- Engineering 1 Task Force Committee Fall 2003 through Fall 2004
- Engineering 2 Participant – Spring/Fall 2002 and Spring 2003
- Engineering 5 Instructor – Fall/Spring 2003 and 2004
- Civil Engineering Department Presentation for Engineering 5 – Spring/Fall 2004 and 2005
- Support for Summer CHOICES Summer Camp for Middle School Girls 2005 and 2006
- Freshman Advising Fall 2002 through Spring 2005
- Freshman Advising Fall 2007 through Spring 2008

#### ***Department Service***

- 2015 Search Committee Member, Replacement for Shelly Drzod.
- Faculty Search Committee, Chair – CEE Structural Engineering Position 2012 – 2013
- Faculty Search Committee, Member – CEE Professor of Practice 2012 – 2013
- Faculty Search Committee – CEE Khan Chair Position: 2002 – 2005.
- Associate Chair Department of Civil and Environmental Engineering: 2011 – Present
- ABET Coordinator for Lehigh Civil Engineering Degree Program: 2011 – Present
- ABET Self-Study Report Civil Engineering Program Principal Author: 2013
- CEE Undergraduate Curriculum Committee: 2007 – Present
- CEE Department Space Committee 2014 – Member
- 2007 MOLES Student Day Leader for Lehigh University
- 2007 Candidates Day CE Organizer, senior exit survey coordination
- 2003 Committee Chair - ATLSS Web Site Development
- Qualifying Exam Committee 2002 through 2006
- Upperclassmen Parents Weekend Participant Fall 2002 through Fall 2006
- Rising Civil Engineering Sophomore Advising: Spring 2010 – 2013
- Freshmen Advising: Fall 2002 (11 students), Spring 2003 (11 students), Fall 2003 (11 students), Spring 2004 (11 students), Fall 2004 (9 students), Spring 2005 (10 students).
- General Undergraduate Advising: Fall 2009 (13 students).
- Graduate Advising: 2002 (2 students), 2003 (4 students), 2004 (3 students), 2005 (4 students)

#### ***ATLSS Center Service***

- 2003-2004 Website Development Coordinator
- 2003-2004 NEES Facility Website Coordinator
- 2003-2004 NEES Facility Data Acquisition System Integrator
- Lehigh University ATLSS / PITA REU program coordinator (Summer 2002 and 2003).

#### ***Professional Service Activities***

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- Member Pennsylvania Statewide Innovation Council – Bridge Technical Advisory Group – March 2015
- Member ACI Committee 318-G Precast and Prestressed Concrete: 2014 – Present
- Associate Member of the ASCE 7-16 Subcommittee On Tsunami Loads And Effects: 2011 – Present
- Chair of the PCI Blast Resistance and Structural Integrity Committee: 2009 – Present
- Vice Chair of the PCI Blast Resistance and Structural Integrity Committee: 2008 – 2009
- PCI Technical Activities Council Member: 2010 – Present
- PCI 8<sup>th</sup> Edition Handbook Committee Member: 2010 – Present
- Technical Committee Voting Member, ACI 370 Blast and Impact Load Effects: 2011 - Present
- Technical Committee Voting Member, PCI Journal Advisory Council: 2014 - Present
- PCI/NIST - Disproportionate Collapse Review Group: 2012 – Present
- Blue Ribbon Review Committee for the 7<sup>th</sup> edition of the PCI Handbook
- Member of the PCI Strand Bond Task Force: 2005 – 2011
- Technical Committee Associate Member, ACI 369 Seismic Repair and Rehabilitation: 2003 – 2006
- Mentor Natural Hazard Mitigation Program in Japan: 2003
- Self-Consolidating Concrete for Use in Bridge Beam Production Workshop Organizer: 2004

#### ***Membership in Professional Societies***

- Precast / Prestressed Concrete Institute (PCI) Member Jan. 2003
- American Concrete Institute (ACI) Member #3918772
- Network for Earthquake Engineering Simulation (NEES) Member

- American Society of Civil Engineers (ASCE) Member #396229
- Structural Engineering Association of Northern California (SEAONC)
- Earthquake Engineering Research Institute (EERI) Member #6323
- Consortium of Universities for Research in Earthquake Engineering (CUREE) Member
- Network for Earthquake Engineering Simulation (NEES) Consortium Member
- Member, Lehigh Valley ASCE

## Continuing Education

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- July 2003, EXCEED Excellence in Civil Engineering Education Teaching, ASCE-West Point.
- July 27 – August 1, 2003: American Society of Civil Engineers – Excellence in Civil Engineering Education Teaching Workshop
- July 31 – August 2 2006: Portland Cement Association – The Engineering and Economics of Reinforced Concrete Buildings – 21 hours – 2.1 Credits
- August 3 – August 4 2006: Portland Cement Association – Design of Concrete Bridges by the AASHTO LRFD Specifications – 14 hours – 1.4 Credits

## Reviews

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1. *American Society of Civil Engineers (ASCE) Journal of Performance of Constructed Facilities, October 2014.*
2. *American Concrete Institute Special Publication, July 2014.*
3. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering, July 2014.*
4. *American Society of Civil Engineers (ASCE) Journal of Performance of Constructed Facilities, May 2014.*
5. *American Society of Civil Engineers (ASCE) Journal of Waterway, Port, Coastal and Ocean Engineering, March 2014.*
6. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering, November 2013.*
7. *The Arabian Journal for Science and Engineering, Springer, April 2013.*
8. *American Society of Civil Engineers (ASCE) Journal of Performance of Constructed Facilities, January 2013.*
9. *American Society of Civil Engineers (ASCE) Journal of Engineering Mechanics, June 2012.*
10. *American Society of Civil Engineers (ASCE) Journal of Bridge Engineering, April 2012.*
11. Reviewer for ARISTEIA Research Programme - Ministry of Education, Lifelong Learning and Religious Affairs, Athens Greece, Jan 2012.
12. Reviewer for the *Precast/Prestressed Concrete Institute 2011 PCI Convention*, Proceedings, August, 2011.
13. Reviewer for *American Concrete Institute Journal of Structural Engineering*, August, 2011.
14. *American Society of Civil Engineers (ASCE) Journal of Bridge Engineering, April 2011.*
15. *American Society of Civil Engineers (ASCE) Journal of Performance of Constructed Facilities, April 2011.*
16. *American Society of Civil Engineers (ASCE) Journal of Waterway, Port, Coastal, and Ocean Engineering, March 2011.*
17. *American Society of Civil Engineers (ASCE) Journal of Bridge Engineering, March 2011.*
18. Grant Review Panel Participant, CMMI – Mechanical Behavior of Composites, National Science Foundation, Washington D.C., February 2011.
19. Technical Review Committee. *PCI Annual Convention and National Bridge Conference*, 2011.
20. NSF Electronic Proposal Review, Joint Research Grants, National Science Foundation, December 2010.
21. *American Society of Civil Engineers (ASCE) Journal of Waterway, Port, Coastal, and Ocean Engineering, Manuscript Review, September 2010.*
22. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering, January 2010.*
23. Reviewer for the FEMA Reference Manual to Mitigate Potential Terrorist Attacks Against Buildings, P-426, December 2009.
24. Reviewer for the PCI Report: *State of the Art of Precast/Prestressed Adjacent Box Beam Bridges* – October 2009.
25. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, August, 2009.
26. Blue Ribbon Review Panel Member, *Precast/Prestressed Concrete Institute 7<sup>th</sup> Edition Design Handbook*, Chicago, IL, July 2009.
27. *Steel and Composite Structures Journal*, June 2009.
28. *American Society of Civil Engineers (ASCE) Journal of Composites for Construction*, September, 2008.
29. Grant Review Panel Participant, Infrastructure Materials Applications and Structural Mechanics (IMASM), National Science Foundation, Washington D.C., May 2008.
30. *ASME Journal of Applied Mechanics*, April, 2008.
31. *Elsevier Engineering Structures*, July, 2007.

32. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, July, 2007.
33. *Kuwait Journal of Science and Engineering*, July, 2007.
34. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, April, 2007.
35. *Journal of the Precast Prestressed Concrete Institute*, March 2007.
36. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, April, 2006.
37. *Journal of the Precast Prestressed Concrete Institute*, January 2006.
38. *American Concrete Institute Journal of Structural Engineering*, December, 2005.
39. *Structural Engineering and Mechanics an International Journal*, October 2005.
40. Reviewer on behalf of PCI for 90% Draft FEMA Publication 453 Safe Havens and Shelter-in-Place, Oct. 2005.
41. Reviewer for 8<sup>th</sup> US National Conference on Earthquake Engineering, 2006.
42. *Japan Concrete Institute Journal of Advanced Concrete Technology*, Aug., 2005.
43. *American Concrete Institute Journal of Structural Engineering*, June, 2005.
44. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, May, 2005.
45. *American Concrete Institute Journal of Structural Engineering*, June, 2004.
46. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, May, 2004.
47. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, Apr., 2004.
48. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, 2004 .
49. *American Society of Civil Engineers (ASCE) Journal of Structural Engineering*, Jan., 2004.
50. Earthquake Engineering Research Institute (EERI) Student Paper Competition, Dec., 2003.
51. American Society of Civil Engineers (ASCE) *Journal of Materials in Civil Engineering*, Sept., 2003.
52. Grant Review Panel Participant, Structural Systems and Hazard Mitigation of Structures Program in CMS/ENG, National Science Foundation, Washington D.C., March 2003.