

FRANKLIN L. MOON



CURRICULUM VITAE

Associate Professor
Department of Civil, Architectural and Environmental Engineering
Drexel University

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PROFESSIONAL PREPARATION

Ph.D., Civil Engineering, Georgia Institute of Technology, 2004

Thesis title: *Seismic strengthening of low-rise unreinforced masonry structures with flexible diaphragms*

Advisors: Professor Roberto T. Leon and Professor Lawrence F. Kahn

M.S., Civil Engineering, University of Delaware, 2000

Thesis title: *Large-scale experimental validation of an all-composite bridge deck and deck connections*

Advisor: Professor John W. Gillespie, Jr.

B.S., Civil Engineering, University of Delaware, 1998

Cum Laude

APPOINTMENTS

9/10 - present	Associate Professor, Department of Civil, Architectural and Environmental Engineering, Drexel University
1/04 - present	Assistant Professor, Department of Civil, Architectural and Environmental Engineering, Drexel University
9/00 – 12/03	Research Assistant, School of Civil and Environmental Engineering, Georgia Institute of Technology

1/03 – 12/03	Teaching Assistant, School of Civil and Environmental Engineering, Georgia Institute of Technology
9/98 – 6/00	Research Assistant, Center for Composite Materials, University of Delaware

HONORS AND AWARDS

CAREER Award, National Science Foundation	2009
Alan H. Yorkdale Memorial Award, ASTM	2007
Best Journal Paper Award, The Masonry Society	2007
Best Doctoral Dissertation, The Masonry Society	2004
Outstanding Paper Award, 9th North American Masonry Conference	2003
Presidents Fellowship, Georgia Tech	2000-03
Research Award, International Concrete Repair Institute	2002
Halliburton Fellowship, Georgia Tech	2000
George W. Laird Fellowship, University of Delaware	1999
Davis Fellowship, University of Delaware	1998-99
Dean's List, University of Delaware	1994-98
Tau Beta Pi - National Engineering Honor Society	1998
Chi Epsilon - National Civil Engineering Honor Society	1998
George S. Pruse Scholarship, University of Delaware	1997, 98
Liston A. Houston Scholarship, University of Delaware	1998
Duffield Associates Award, University of Delaware	1998
K.C.I. Technologies Award, University of Delaware	1998
Scholar Athlete, Northeast Athletic Conference	1995

PUBLICATION RECORD

Publication Key

R	Archival Journal Publication
S/R	Submitted Archival Journal Publication
CR	Referred Conference Publication
C	Conference Publication
T	Technical Report
Th	Thesis
*	Publications included in dossier

Archival Journals

- R/S.1 Pan, Q, K. Grimmelsman, F.L. Moon and A.E. Aktan (201-) "Mitigating Epistemic Uncertainty in Structural Identification," Accepted ASCE Journal of Structural Engineering
- R/S.2 Ciloglu, K., Y. Zhou, F.L. Moon and A.E. Aktan (201-) "Propagation of Epistemic Uncertainty in Structural Identification," Submitted to the ASCE Journal of Engineering Mechanics

- R/S.3 Zhang, J., J. Prader, K.A. Grimmelsman, F.L. Moon and A.E. Aktan; with, Shama, A.(201-) "Experimental Vibration Analysis for Structural Identification of a Long Span Suspension Bridge," Submitted to the ASCE Journal of Engineering Mechanics
- R/S.4 Zhang, J., N. Dubbs, and F.L. Moon (201-) "A Probability-Based Multiple Model Approach for Structural Identification," Submitted to the Engineering Structures
- R.5 Minaie, E., M. Mota, F.L. Moon, and A.A. Hamid (2010) "In-plane behavior of partially-grouted, reinforced concrete masonry walls," *ASCE Journal of Structural Engineering*, Vol. 136, No. 9, pp. 1089-1097
- R.6 P.L. Gurian, A.E. Aktan, F. Montalto, and F. Moon (2009) "Research Priorities for Infrastructure Asset Management", COMMONWEALTH: A Journal of Political Science.
- R.7 Moon, F., A.E. Aktan, F. Jalinoos, S. Jin (2009) "Leveraging Technology for Performance Based Bridge Engineering," Paper Invited for Review and Publication at Materials Evaluation, Journal of ASNT
- R.8 Moon, F.L., A.E. Aktan, H. Furuta, and M. Dogaki (2009) "Governing issues and alternate resolutions for a highway transportation agency's transition to asset management," *Journal of Structure and Infrastructure Engineering*, Vol. 5, No. 1, pp 25-39
- R.9 Chen, S.-Y., Moon, F.L., and T. Yi (2008) "A macroelement for the nonlinear analysis of in-plane unreinforced masonry piers," *Journal of Engineering Structures*, Vol. 30, No. 8, pp. 2242-2252
- R.10 Yi, T., Moon, F. L., Leon, R. T. Leon, and Kahn, L. F. (2008) "Flange effects on the nonlinear behavior of URM piers," *The Masonry Society Journal*, Vol. 26, No. 2, pp. 31-42
- R.11 Moon, F. L., Yi, T., Leon, R. T., and Kahn, L. F. (2007) "Testing of a full-scale URM building following seismic retrofit," *ASCE Journal of Structural Engineering*, Vol. 133, No. 9, pp. 1215-1226
- R.12 Moon, F.L. and A.E. Aktan (2006) "Impacts of epistemic uncertainty on structural identification of constructed systems", *The Shock and Vibration Digest*, Vol. 38, No. 5, pp. 399-420
- R.13 Yi, T., Moon, F. L., Leon, R. T., and Kahn, L. F. (2006) "Lateral load tests on a two-story unreinforced masonry building," *ASCE Journal of Structural Engineering*, Vol. 132, No. 5, pp. 643-652
- R.14 Yi, T., Moon, F. L., Leon, R. T., and Kahn, L. F. (2006) "Analyses of a two-story unreinforced masonry building," *ASCE Journal of Structural Engineering*, Vol. 132, No. 5, pp. 653-662
- R.15 Moon, F. L., Yi, T., Leon, R. T., and Kahn, L. F. (2006) "Recommendations for the seismic evaluation and retrofit of low-rise URM structures," *ASCE Journal of Structural Engineering*, Vol. 132, No. 5, pp. 663-672
- R.16 Yi, T., Moon, F. L., Leon, R. T., and Kahn, L. F. (2006) "Effective pier model for the nonlinear in-plane analysis of individual URM piers," *The Masonry Society Journal*, Vol. 23, No. 1, pp. 21-35
- R.17 Moon, F. L and J. W. Gillespie Jr. (2005) "Experimental validation of a shear stud connection between steel girders and a fiber-reinforced polymer deck in the transverse direction", Technical Note, *ASCE Journal of Composites for Construction*, Vol. 9, No. 3, pp. 284-287
- R.18 Moon, F. L., D. A. Eckel, and J. W. Gillespie (2002) "Shear stud connections for the development of composite action between steel girders and fiber-reinforced polymer bridge decks," *ASCE Journal of Structural Engineering*, Vol. 128, No. 6, June pp. 762-770

Refereed Conferences Papers

- C/R.1 Dubbs, N., F.L. Moon and A.E Aktan (2010) "Design and implementation of load cell bearings to measure dead and live load effects in an aged long span bridge," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.2 Prader, J., J. Zhang, F.L. Moon and A.E. Aktan (2010) "Challenges and uncertainty mitigation in structural identification of long span bridges," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.3 Aktan, A.E. and F.L. Moon (2010) "Mitigating infrastructure performance failures through risk-based asset management," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.4 Zhou, Y., J. Weidner, J. Prader, N. Dubbs, F.L. Moon, A.E. Aktan (2010) "Parameter identification of a reinforced concrete T-beam bridge," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.5 Weidner, J., J. Prader, N. Dubbs, F.L. Moon, A.E. Aktan (2010) "The role of structural identification in asset management," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.6 Dubbs, N., F.L. Moon, A.E. Aktan (2010) "Load capacity estimation for the Burlington Bristol Bridge," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.7 Pradhan, A., P.L. Gurian, F. Montalto, F.L. Moon and A.E. Aktan (2010) "System identification of Multi-Domain (Human, Natural and Engineered) infrastructure systems," International Association for Bridge Management and Safety, Fifth International Conference on Bridge Maintenance, Safety and Management, Philadelphia
- C/R.8 Minaie, E, M. Mota, F.L. Moon and A.A. Hamid (2009) "Seismic response of partially-grouted masonry shear walls," 11th Canadian Masonry Symposium, Toronto, CA
- C/R.9 Moon, F.L., P. Gurian, F. Montalto, and A.E. Aktan (2008) "Integrating human, natural and engineered systems and associated paradigms for infrastructure asset management," Fourth International Conference on Bridge Maintenance, Safety and Management, Seoul, Korea
- C/R.10 Moon, F.L., A.E. Aktan, F. Jalinoos, and H. Ghasemi (2008) "Structure and infrastructure health monitoring as a key enabling paradigm for integrated asset management," Fourth International Conference on Bridge Maintenance, Safety and Management (IABMAS 08), Seoul, Korea.
- C/R.11 Golecki, T., E. Holly, F.L. Moon, and A.A. Hamid (2006) "Similitude of 1/3 scale concrete masonry units," 10th North American Masonry Conference, St. Louis, MO
- C/R.12 Mota, M., E. Minaie, T. Golecki, E. Holly, F.L. Moon, and A.A. Hamid (2006) "Diagonal tension strength of partially grouted masonry assemblages," 10th North American Masonry Conference, St. Louis, MO
- C/R.13 Moon, F.L. and A.E. Aktan (2006) "Structural Identification of Constructed Systems and the Impact of Epistemic Uncertainty," IABMAS'06 - Third International Conference on Bridge Maintenance, Safety and Management, Porto, Portugal

- C/R.14 Aktan, A.E. and F.L. Moon (2006) "Governing Issues and Alternate Resolutions for a State Department of Transportations' Transition to Asset Management", IABMAS'06 - Third International Conference on Bridge Maintenance, Safety and Management, Porto, Portugal
- C/R.15 Moon*, F.L. and A.A. Hamid (2005) "Effect of mortar type on the seismic response of partially grouted reinforced masonry shear walls," 10th Canadian Masonry Symposium, Banff, Alberta, Canada
- C/R.16 Moon, F. L., T. Yi, R. T. Leon, and L. F. Kahn (2003) "Large-scale tests of an unreinforced masonry low-rise building," Proceedings of the Ninth North American Masonry Conference, Clemson, SC
- C/R.17 Yi, T., F. L. Moon, R. T. Leon, and L. F. Kahn (2003) "Structural Analysis of a Prototype Unreinforced Masonry Low-Rise Building" Proceedings of the Ninth North American Masonry Conference. Clemson, SC.
- C/R.18 Moon, F. L., T. Yi, R. T. Leon, and L. F. Kahn (2002) "Seismic strengthening of unreinforced masonry structures with FRP overlays and post-tensioning," Proceedings of the 12th European Conference on Earthquake Engineering, London, UK.
- C/R.19 Moon F. L., T. Yi, R. T. Leon, and L. F. Kahn (2001) "Retrofit of URM Structures with FRP Overlays and Post-Tensioning," Rehabilitation and Repairing the Buildings and Bridges of the Americas – Hemispheric Workshop on Future Directions, ASCE, Reston, VA

Conference Papers

- C.1 Aktan, A.E. and F.L. Moon (2010) "Risk of Infrastructure Performance Failures," Invited Presentation and Paper, SPIE, Nondestructive Characterization for Composite Materials, Aerospace Engineering, Civil Infrastructure, and Homeland, San Diego
- C.2 Moon, F.L., A.E. Aktan, Yegian, M., Irfanoglu, A., Sozen, M., Hurlebaus, S., J. Roesset, (2009) "Reforming Civil Engineering Education in the USA," Paper Invited for Presentation and Publication in the Proceedings of a European Symposium on Civil Engineering Education, Turkey.
- C.3 Zhang, J., Prader, K.A. Grimmelsman, F.L. Moon, A.E. Aktan, and A. Shama (2009) "Challenges in Experimental Vibration Analysis for Structural Identification and Corresponding Engineering Strategies," Keynote Paper, *Experimental Vibration Analysis for Civil Engineering Structures (EVACES)*, October 14-16, 2009, Wroclaw, Poland
- C.4 Moon, F.L., A.E. Aktan, D. Lowdermilk, and L. Egan (2009) "Structural Identification of Various Constructed Systems to Inform Decisions," 2009 ASCE Structures Congress, Austin, TX
- C.5 Weidner, J., J. Prader, N. Dubbs, F.L. Moon and A.E. Aktan (2009) "Structural Identification of Bridges to Assess Safety and Performance," 2009 ASCE Structures Congress, Austin, TX
- C.6 Moon, F.L. J. Laning, D.S. Lowdermilk, S. Chase, J. Hooks, and A.E, Aktan (2009) "A Pragmatic, Risk-based Approach to Prioritizing Bridges," Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, SPIE, San Diego, CA.
- C.7 Minaie, E., M. Mota, F.L. Moon and A. A. Hamid (2008) "In-plane response of partially grouted concrete masonry shear walls," Proceedings of the Network for Earthquake Engineering Simulation (NEES), Seattle, WA

- C.8 Prader, J., Weidner, J., Moon, F.L., Aktan, A.E., Taylor, J., and Liss, F. (2008) "Load Testing, Analysis and Structural Health Monitoring for Evaluating the Load Capacity of Aged R.C. Bridges," Paper No. IBC-08-18, 25th Annual International Bridge Conference, Engineers Society of Western Pennsylvania, Pittsburgh, PA
- C.9 Prader, J.C., K.A. Grimmelsman, F. Jalinoos, H. Ghasemi, S. Burrows, J. Taylor, F. Liss, F.L. Moon and A.E. Aktan (2006) "Load Testing and Rating of Undocumented Reinforced Concrete Bridges," The American Society for Nondestructive Testing: NDE Conference on Civil Engineering, St. Louis, MO
- C.10 Grimmelsman, K., K. Ciloglu, Q. Pan, R. Zhang, F.L. Moon and A.E. Aktan (2005) "Impacts of Uncertainty and their Mitigation for Improving Data Reliability from Field Measurements," 2nd International Conference on Structural Health Monitoring of Intelligent Infrastructure, Shenzhen, China
- C.11 Leon, R.T., F.L. Moon, T. Yi, and L.F. Kahn (2005) "Testing of a full-scale URM building following seismic retrofit," IABSE Symposium 2005, Lisbon, Portugal
- C.12 Hamid, A.A., F.L. Moon, and R. Drysdale (2005) "Lightly reinforced partially grouted concrete masonry: A proposed viable building system in low seismic areas," First Canadian Conference on Effective Design of Structures, McMaster University, Hamilton, Ontario, Canada.
- C.13 Aktan, A.E. and F.L. Moon (2005) "The health monitoring paradigm and associated technology needs for civil engineers," 11th International Colloquium on Structural and Geotechnical Engineering, Cairo, Egypt.
- C.14 Moon*, F.L. and A.E. Aktan (2004) "Health monitoring for real-time post-hazard highway bridge reliability assessment," 2004 International Seminar on "Next Generation of Bridge Technology", Korea Bridge Design & Engineering Research Center (KBRC)
- C.15 Yi, T., F. L. Moon, R. T. Leon, and L. F. Kahn (2002) "Performance Characteristics of Unreinforced Masonry Low-Rise Structures before and after Rehabilitation," Proceedings of the Seventh National Conference on Earthquake Engineering, Boston, MA

Other Publications

- T.1 Weidner, J., J.B. Prader, F.L. Moon* and A.E. Aktan (2009) "Load Testing, Model Calibration, and Analysis for a Three-Span Reinforced Concrete T-Beam Bridge and a Highly Deteriorated Filled Arch Bridge," Final Report, submitted to the West Virginia Department of Transportation and the FHWA NDE Center.
- T.2 Weidner, J., J.B. Prader, F.L. Moon* and A.E. Aktan (2009) "Load Testing and Analysis of a Reinforced Concrete Filled Arch Bridge Including Intermediate Evaluation of a Rapid Bridge Screening Device," Final Report, submitted to the West Virginia Department of Transportation and the FHWA NDE Center.
- T.3 Prader, J.B., K.A. Grimmelsman, H. Hassanain, F.L. Moon* and A.E. Aktan (2007) "Load Testing, Analysis and Structural Health Monitoring for Evaluating the Load Capacity of Aged RC Bridges without Plans or Information on Soil, Foundation and/or Structural Properties," Final Report, submitted to the West Virginia Department of Transportation and the FHWA NDE Center.

- T.4 Hamid, A.A. and F.L. Moon* (2005) "Seismic analysis of partially-grouted reinforced masonry walls constructed using masonry cement mortar," Portland Cement Association, Report - PCA Index No. 03-12
- T.5 Moon, F. L., D. A. Eckel II, J. W. Gillespie, Jr. (1999) "Static and Fatigue Response of Longitudinal Connection Between Steel Girders and FRP Composite Decks", University of Delaware Center for Composite Materials Technical Report, CCM 99-09
- T.6 Moon, F. L., D. A. Eckel II, J. W. Gillespie, Jr. (1999) "Static and Fatigue Response of Transverse Connection Between Steel Girders and FRP Composite Decks", University of Delaware Center for Composite Materials Technical Report, CCM 99-10
- T.7 D. A. Eckel II, F. L. Moon, J. W. Gillespie, Jr. (1999) "Flexural Response and Damage Tolerance of FRP Composite Decks", University of Delaware Center for Composite Materials Technical Report, CCM 99-11
- T.8 D. A. Eckel II, F. L. Moon, J. W. Gillespie, Jr. (1999) "Static and Fatigue Response of Composite Decks Subjected to Wheel Loads", University of Delaware Center for Composite Materials Technical Report, CCM 99-12
- Th.1 Moon, F. L. (2004) "Seismic Strengthening of Low-Rise Unreinforced Masonry Structures with Flexible Diaphragms," Ph.D. Dissertation, Georgia Institute of Technology, Atlanta, GA.
- Th.2 Moon, F.L. (2000) "Large-Scale Experimental Validation of an All-Composite Bridge Deck and Deck Connections", Masters Thesis, University of Delaware, Newark, DE

RECORD OF PRESENTATIONS AND SEMINARS

Invited Presentations

1. Aktan, A.E., F.L. Moon and D.S. Lowdermilk (2010) "Overview of Structural Identification Best Practices," *Five Lectures* Invited for Presentation at the CISM (International Centre for Mechanical Sciences) Professional Course on "Monitoring, Control and Identification of Bridges by Dynamic Methods," Udine, Italy, May
2. Moon, F.L. (2008) "Masonry Design and Related Research and Educational Activities at Drexel University," Presentation to the Delaware Valley Association of Professional Engineers, Philadelphia, PA.
3. Moon, F.L., M. Mota, M. Salama, E. Minaie, and A.A. Hamid (2007) "Effect of mortar formulation on the response of partially-grouted reinforced masonry shear walls," The Masonry Society, Annual Meeting, Pittsburgh, PA.
4. Moon, F.L., J. Prader, K. Grimmelsman, and A.E. Aktan (2007) "Load Rating of Undocumented Bridges," TRB, Concrete Bridge Committee, Washington, D.C.
5. Moon, F.L. (2006) "System-level response of unreinforced masonry structures," Department of Civil Engineering, University of Minho, Guimarães, Portugal.
6. Moon, F.L. and A.A. Hamid (2005) "Research and educational activities at Drexel University," The Masonry Society, Annual Meeting, Cincinnati, OH

7. Moon, F.L., T. Yi, R.T. Leon, and L.F. Kahn (2005) "Experimental testing of a full-scale two-story unreinforced masonry structure following the application of FRP composites," American Concrete Institute, Annual Meeting, New York, NY
8. Moon, F.L., T. Yi, R.T. Leon, and L.F. Kahn (2005) "Full-scale test of a two-story unreinforced masonry building," The Masonry Society, Annual Meeting, Baltimore, MD.
9. Moon, F.L. (2004) "Seismic strengthening of Unreinforced masonry structures," Department of Civil and Environmental Engineering, University of Delaware, Newark, DE.

Conference and Workshop Presentations

1. Moon, F.L., A.E. Aktan, M. Yegian, A. Irfanoglu, M. Sozen, S. Hurlebaus, and J. Roesset (2009) "Reforming Civil Engineering Education," Opening Presentation for a Special Session on Engineering Education Reform, 2009 ASCE Structures Congress, Austin, TX
2. Moon, F.L., Weidner, J., J. Prader, N. Dubbs, and A.E. Aktan (2009) "Structural Identification of Bridges to Assess Safety and Performance," 2009 ASCE Structures Congress, Austin, TX
3. Moon, F.L. J. Laning, D.S. Lowdermilk, S. Chase, J. Hooks, and A.E. Aktan (2009) "A Pragmatic, Risk-based Approach to Prioritizing Bridges," Smart Structures and Materials & Nondestructive Evaluation and Health Monitoring, SPIE, San Diego, CA.
4. Moon, F.L. (2008) "Infrastructure systems and asset management," Opening Presentation for the NSF and FHWA-Supported Workshop on Infrastructure Asset Management, Istanbul, Turkey
5. Moon, F.L., P. Gurian, F. Montalto, and A.E. Aktan (2008) "Integrating human, natural and engineered systems and associated paradigms for infrastructure asset management," Fourth International Conference on Bridge Maintenance, Safety and Management (IABMAS 08), Seoul, Korea
6. Moon, F.L., J. Weidner, J. Prader, A.E. Aktan, and J. Jalinoos (2008) "Towards a rapid screening device," The Mid-Atlantic States Quality Assurance Conference, Morgantown, WV.
7. Moon, F.L., D. Lowdermilk, L. Egan, and A.E. Aktan (2008) "Smart applications of technology to aging infrastructures," Northeast Association of State Transportation Officials (NASTO) Annual Conference, Pittsburgh, PA.
8. Moon, F.L. Q. Pan, J. Prader, K. Grimmelsman, and A.E. Aktan (2007) "Structural Identification of Constructed Systems," 6th International Workshop on Structural Health Monitoring, Stanford University, Palo Alto, CA
9. Moon, F.L. (2006) "The role of field laboratories in the education of renaissance engineers," NSF-Supported Workshop on the Future of Civil and Environmental Engineering Education, Istanbul, Turkey.
10. Moon*, F.L. and A.E. Aktan (2006) "Structural Identification of Constructed Systems and the Impact of Epistemic Uncertainty," IABMAS'06 - Third International Conference on Bridge Maintenance, Safety and Management, Porto, Portugal
11. Moon*, F.L. and A.A. Hamid (2005) "Effect of mortar type on the seismic response of partially grouted reinforced masonry shear walls," 10th Canadian Masonry Symposium, Banff, Alberta, Canada

12. Moon, F. L., T. Yi, R. T. Leon, and L. F. Kahn (2003) "Large-scale tests of an unreinforced masonry low-rise building," Proceedings of the Ninth North American Masonry Conference, Clemson, SC
13. Yi, T., F. L. Moon, R. T. Leon, and L. F. Kahn (2002) "Performance Characteristics of Unreinforced Masonry Low-Rise Structures before and after Rehabilitation," Proceedings of the Seventh National Conference on Earthquake Engineering, Boston, MA

Sessions and Workshops Organized/Chaired

1. "Health Monitoring of Bridges for Asset Management," (2009) Chair: F.L. Moon and A.E. Aktan, IWSHM, 7th International Workshop on Structural Health Monitoring, Stanford University
2. "The Role of Structural Identification in Infrastructure Decision Making," (2009) Chairs: F.L. Moon and E.S. Bell, ASCE Structures Congress, Austin, TX
3. Mini-Symposium: "Integrating health monitoring and lifecycle management of bridge and highways," (2008) Chairs: F.L. Moon and F.N. Catbas, Fourth International Conference on Bridge Maintenance, Safety and Management (IABMAS 08), Seoul, Korea
4. "An International Workshop on Performance-Based Infrastructure Asset Management," (2008) A.E. Aktan (PI), F.L. Moon, P. Gurian, F. Montalto, Supported by NSF and FHWA, Istanbul, Turkey
5. "Reforming Civil Engineering Education Given the Societal Challenges Related to Infrastructures," (2006) A.E. Aktan (PI) and F.L. Moon, Supported by NSF, Istanbul Turkey

RESEARCH AND EDUCATION PROPOSALS AWARDED

Principal Investigator (\$4,309,254)

1. "Automated Non-Destructive Evaluation and Rehabilitation System (ANDERS)," N. Gucunski (PI, Rutgers), P.N. Balaguru (Rutgers), J. Yi (Rutgers), F.L. Moon (Drexel PI), A.E. Aktan, B. Johansson (MALA), B. Volodin (PD-LD), and J. Rosca (Siemens Research Corporation), NIST TIP, 9/2009 to 8/2014, Drexel Match: \$2,431,270, Sponsor Funding to Drexel: \$2,192,254
2. "CAREER: Structural Identification to Inform Infrastructure Decision-Making," F.L. Moon (PI), NSF, Award Number CMMI-0846591, 9/2009-8/2014, Sponsor funding: \$400,000 (Drexel contribution: \$78,000)
3. "Structural Health Monitoring and Structural Identification of Burlington County's Long-Span, Landmark Bridges," F.L. Moon (PI) and A.E. Aktan, Burlington County Bridge Commission, 3/2008 to 4/2013 (renewable), Sponsor funding: \$975,000
4. "System-level Seismic Research of Concrete Masonry Buildings" F.L. Moon (PI), A.A. Hamid, National Concrete Masonry Association, Portland Cement Association, International Masonry Institute, 1/2008 to 12/2011, Sponsor funding: \$300,000 (Drexel contribution: \$326,000)
5. "A Falling-Weight Device for Quantitative Screening of Undocumented Bridges," F.L. Moon (PI) and A.E. Aktan, U.S. Federal Highway Administration, Project TPF-5(113), 8/2007 to 12/2008, Sponsor funding: \$183,000

6. "SGER: A Multivariate Calibration of Structural Identification for Applications to Constructed Facilities" F.L. Moon (PI), H. Sohn (Carnegie Mellon), NSF, Award Number 0704233, 2/2007 to 10/2007, Sponsor funding: \$55,000 (Drexel share: \$33,000)
7. "Effect of Mortar Formulation on the In-plane Cyclic Response of Partially Grouted Reinforced Masonry Shear Walls," F.L. Moon (PI) and A.A. Hamid, Portland Cement Association, 9/2005 to 8/2007, Sponsor funding: \$163,000
8. "The Use of Small-Scale Models for Masonry Education and Research," F.L. Moon (PI) and A.A. Hamid, National Concrete Masonry Association – Education and Research Foundation, 6/2005 to 8/2006, Sponsor funding: \$50,000
9. "The Drexel University Masonry Design Competition" F.L. Moon (PI), National Concrete Masonry Association – Education and Research Foundation, 9/2006 to 6/2008, Sponsor funding: \$13,000

Co-Principal Investigator (~\$246,000 of \$1,127,000)

1. "Structural Identification of the International Bridge," A. Pradhan (PI), F.L. Moon (5%), and A.E. Aktan, FHWA (pass through Rutgers), 7/2010 to 6/2011, Sponsor funding: \$60,000
2. "Collaborative Research: The Learning Bridge," A.E. Aktan (PI), F.L. Moon (25%), P.L. Gurian and F. Montalto, NSF, 9/2009 to 8/2011, Sponsor Funding: \$275,000
3. "An International Workshop on Performance-Based Infrastructure Asset Management," A.E. Aktan (PI), F.L. Moon (10%), P. Gurian, F. Montalto, NSF, 4/2008 to 3/2009, Sponsor funding: \$35,000
4. "Engineering and Design Services for Green Infrastructure Network in the Point Breeze Neighborhood," F. Montalto (PI), C. Haas, J. Britton, G. Hsuan, F.L. Moon (5%), A. Reddy, J. Wen, M. Olson, Philadelphia Water Department, 5/2008, Sponsor funding: \$100,000
5. "Local Fatigue Assessment of the Burlington-Bristol Bridge," J. Martin (PI), F.L. Moon (30%), and A.E. Aktan, Burlington County Bridge Commission, 8/24/2007, Sponsor funding: \$45,000
6. "Load Testing of Undocumented Bridges with Applications to West Virginia Coal Resource Transportation System Bridges - Phase II," A.E. Aktan (PI) and F.L. Moon (30%), U.S. Federal Highway Administration, Project TPF-5(113), 8/2006 to 2/2007, Sponsor funding: \$93,000
7. "Reforming Civil Engineering Education Given the Societal Challenges Related to Infrastructures," A.E. Aktan (PI) and F.L. Moon (10%), NSF, Award Number 0450420, 9/2006 to 8/2007, Sponsor funding: \$16,000
8. "The Drexel University GAANN Program: Educating Renaissance Engineers," C.N. Haas (PI), F.L. Moon (25%), P. Gurian, J. Win, A.E. Aktan, A. Reddy, P.M. Shankar, X. Hu, and M. Choi, U.S. Department of Education, 9/2006 to 8/2009, Sponsor funding: \$503,000 (Drexel contribution: \$220,000)

RESEARCH AND EDUCATION PROPOSALS DECLINED FOR FUNDING

Principal Investigator (\$6,931,592)

1. "Tools, Models and Methods for Enhancing the Resilience of Unreinforced Masonry Structures to Earthquakes," A. Schultz (PI, UMN), F.L. Moon (Drexel PI), J. McCormick (U Mich), and L. Comfort (U Pitt), NIST ARRA, 9/2009 to 8/2012, Sponsor Funding to Drexel: \$248,947

2. "Structural Identification of the Easton-Phillipsburg Bridge," F.L. Moon (PI) and A.E. Aktan, Delaware River Joint Toll Bridge Commission, 9/2009 to 8/2011, Sponsor Funding: \$160,000
3. "NEESR-CR: Reducing Socio-Technical Barriers to the Retrofit of Unreinforced Masonry Buildings," A. Schultz (PI, UMN), F.L. Moon (Drexel PI), J. McCormick (U Mich), and L. Comfort (U Pitt), NSF, 9/2009 to 8/2012, Sponsor Funding to Drexel: \$229,113
4. "NEESR-SG: Reducing the socio-technical barriers to the retrofit of unreinforced masonry structures," F.L. Moon (PI), A. Schultz (UMN), L. Comfort (Pitt), J. McCormick (UMich), and S. Gross (Villanova), NSF, Submitted 3/2008, Sponsor Funding: \$1,550,000
[Recommended by panel]
5. "NEESR-II: Development and Validation of a Macroelement Model for the Simulation URM Buildings," F.L. Moon (PI) and A. Schultz (UMN), NSF, Submitted 1/2007, Sponsor Funding: \$374,852
[Recommended by panel]
6. "A Multivariate Calibration of Structural Identification for Applications to Constructed Facilities" F.L. Moon (PI), A.E. Aktan, H. Sohn (Carnegie Mellon), NSF, Submitted 10/2006, Sponsor Funding: \$333,671
7. "Enabling Performance-Based Decision through A Holistic Framework for Highway Transportation and its Linkages to other Modes," F.L. Moon (PI), P.L. Gurian, J. Win and A.E. Aktan, FHWA EARP, Submitted 6/2006, Sponsor Funding: \$1,278,362
[Invited Full Proposal]
8. "NEESR-II: Influence of System-level Mechanisms and Bi-directional Input on the Response of Primary URM Components" F.L. Moon (PI), A.E. Schultz (University of Minnesota), D. Dinehart (Villanova), S. Gross (Villanova), NSF, Submitted 1/2006, Sponsor Funding: \$374,998
9. "Impacts of Epistemic Uncertainty on the System-Identification of Constructed Facilities" F.L. Moon (PI), A.E. Aktan, H. Sohn (Carnegie Mellon), NSF, Submitted 10/2005, Sponsor Funding: \$462,490
10. "Veritable Experimentation on Real Infrastructure for Interdisciplinary Engineering Studies - The Drexel VERIFIES Program" F.L. Moon (PI), A.E. Aktan, T. Hewett, NSF, Submitted 8/2005, Sponsor Funding: \$479,145
11. "Baseline Response of Strands within the Anchorage Zones of the Benjamin Franklin Bridge" F.L. Moon (PI), P. Gurian, J. Mullin, Delaware River Port Authority, Submitted 5/2005, Sponsor Funding: \$122,363
12. "NEESR-II: Substructure testing of URM piers under multi-directional seismic loading" F.L. Moon (PI), A.E. Schultz (University of Minnesota), A.A. Hamid, Submitted 3/2005, Sponsor Funding: \$374,921
13. "CAREER: Damage Diagnosis and Prognosis of Constructed Facilities" F.L. Moon (PI), NSF, Submitted 7/2004, Sponsor Funding: \$492,892
14. "NEESR II: Substructure testing of unreinforced masonry piers under multi-directional seismic loading" F.L. Moon (PI), A.E. Schultz (University of Minnesota), A.A. Hamid, Submitted 1/2004, Sponsor Funding: \$449,838

Co-Principal Investigator (~\$1,251,000)

1. "Robust Geometry Capture through Laser Scanning," A. Pradhan (PI), F.L. Moon (5%), NSF, submitted 2/2010, Sponsor Funding: \$250,000
2. "System level seismic response of masonry structures," A. A. Hamid (PI) and F.L. Moon (25%), NIST ARRA, 9/2009 to 8/2012, Sponsor Funding to Drexel: \$500,000
3. "Sustainable Management of Infrastructure Assets: Insights from the Bottom Up," F. Montalto (PI), A.E. Aktan, P.L. Gurian and F.L. Moon (10%), NSF, 9/2009 to 8/2012, Sponsor Funding \$265,000
4. "Managing Technological Change at the Intersection of Urban and Natural Systems," P. Gurian (PI), F.L. Moon (10%), A.E. Aktan, and F. Montalto, NSF, Submitted 2/2008, Sponsor Funding: \$450,000
5. "Mortar Suitability for Low-Lift Grouting Applications – Phase II," A.A. Hamid (PI) and F.L. Moon (25%), International Masonry Institute, Submitted 1/2007, Sponsor Funding: \$80,000
6. "Asset Management for Transportation Infrastructure" A.E. Aktan (PI), F.L. Moon (25%), J.H. Garrett (Carnegie Mellon), H. Sohn (Carnegie Mellon), PennDOT, Submitted 7/2006, Sponsor Funding: \$530,487
7. "Corrosion Monitoring Research for New York City Bridges – Phase 3" A.E. Aktan (PI) and F.L. Moon (25%), FHWA, Submitted 9/2005, Sponsor Funding: \$273,573
8. "NEESR-SG: Seismic Behavior, Vulnerability and Post-Event Safety Evaluation of Irregular Highway Bridges" A.E. Aktan (PI), F.L. Moon (12%), S. Saiidi (University of Nevada, Reno), R. Sause (Lehigh), H. Sohn (Carnegie Mellon), NSF, Submitted 3/2005, Sponsor Funding: \$1,599,994
9. "Developing Organizational, Asset Group and Total System Models - A Road Map For PennDOT's Transition To Asset Management" A.E. Aktan (PI), F.L. Moon (10%), J.H. Garrett (Carnegie Mellon), H. Sohn (Carnegie Mellon), R. Sause (Lehigh), PennDOT, Submitted 1/2005, Sponsor Funding: \$1,627,882
10. "IGERT: Field-Centered Civil and Environmental Systems Research and Education" C.N. Haas (PI), F.L. Moon (10%), A.E. Aktan, A. Reddy, and M Manion, NSF, Submitted 4/2004, Sponsor Funding: \$2,266,226

COURSES DEVELOPED AND SUBSTANTIALLY REVISED

1. Implemented an advanced mechanics graduate course sequence, which included the development of *CIVE 790 (606) Advanced Mechanics of Materials II* and *CIVE 790 (607) Experimental Mechanics* that address solid mechanics from analytical, numerical and experimental perspectives.
2. Revised and reorganized *CIVE 400 Structural Design I* and *CIVE 401 Structural Design II* to include analysis and design projects, the integrated use of contemporary software tools, the implementation of the International Building Code (including earthquake provisions), determination of demand envelopes, probability-based design concepts, and design for energy loading.

COURSES TAUGHT AND CO-TAUGHT

Courses Taught

1. **CIVE 400 – Structural Design I**

Terms: Fall 2004 (42 students), Fall 2005 (29 students), Fall 2006 (43 students), Fall 2007 (54 students), Fall 2008 (63 students)

Average Course Evaluations*:

What is your overall rating of the instructor? 4.8 / 5.0
What is your overall rating of the course? 4.7 / 5.0

2. **CIVE 401 – Structural Design II**

Terms: Winter 2004 (34 students), Winter 2005 (39 students), Winter 2007 (42 students)

Average Course Evaluations*:

What is your overall rating of the instructor? 4.8 / 5.0
What is your overall rating of the course? 4.4 / 5.0

3. **CIVE 510 – Prestressed Concrete Behavior and Design**

Term: Spring 2004 (19 Students)

Course Evaluations*:

What is your overall rating of the instructor? 4.9 / 5.0
What is your overall rating of the course? 4.7 / 5.0

4. **CIVE 790 (606) – Advanced Mechanics of Materials II**

Terms: Winter 2006 (13 students), Winter 2007 (11 students), Winter 2008 (15 students), Winter 2009 (23 students)

Average Course Evaluations*:

What is your overall rating of the instructor? 4.9 / 5.0
What is your overall rating of the course? 4.4 / 5.0

5. **CIVE 790 (607) – Experimental Mechanics**

Terms: Spring 2005 (12 students), Spring 2006 (6 students), Spring 2008 (12 students), Spring 2009 (14 students)

Average Course Evaluations*:

What is your overall rating of the instructor? 4.9 / 5.0
What is your overall rating of the course? 4.6 / 5.0

*Full course evaluations can be found at <http://eval.coe.drexel.edu/> and <http://aefis.coe.drexel.edu/>

Independent Study Courses Taught

1. **CIVE 399 – Building Methods and Design**

Term: Spring 2004 (1 student)

2. **CIVE 399 – Structural Design I**

Term: Spring 2005 (2 students)

3. **CIVE 799 – Prestressed Concrete Design**

Term: Spring 2006 (1 student)

Courses Co-Taught

1. **CIVE 615 – Infrastructure Condition Evaluation**

Co-Taught with Prof. A.E. Aktan

Term: Spring 2004 (5 students)

2. **CIVE 711 – Engineered Masonry**

Co-Taught with Prof. A.A. Hamid

Term: Spring 2006 (7 students)

Senior Design Groups Supervised

1. Pennsylvania Recreation and Commercial Complex (2004-05), 5 students
2. Analysis and Renovation of Northern Valley EMS, Ambulance Station (2005-06), 5 Students
3. Redevelopment of St. John Neumann High School (2005-06), 4 Students
4. Office and Maintenance/Repair Facilities for a Construction Company (2006-07), 4 Students
5. 41st Street Bridge Replacement (2007-08), 5 Students
6. Burlington Bristol Bridge Retrofit and Renewal (2007-08), 5 Students
Placed 2nd in the CAEE Departmental competition
7. Replacement of the 59th Street Bridge (2008-09), 4 Students
8. Rehabilitation and Urban Renewal of the Vine Street Expressway (2008-09), 5 Students
Placed 1st in the CAEE Departmental competition
Placed 3rd in the College of Engineering competition.
9. Replacement of Pedestrian Bridges in Jamaica (2009-10), 5 students

TEACHING WORKSHOPS ATTENDED

1. *Summer Symposia and Workshops for Teaching and Scholarship in the Grand Tradition of Modern Engineering* (Princeton University, Princeton, NJ)
Description: A one week workshop focused on the writings and courses developed and taught by Professor David Billington and Michael Littman.
2. *2004 University Professors' Masonry Workshop* (North Carolina State University, Raleigh, NC)
Description: A three day workshop focused on developing masonry courses for both undergraduate and graduate students as well as developing externally funded research programs in masonry.

RESEARCH SUPERVISION AND ADVISING

Post-Doctoral Research Associates Supervised

1. **Dr. Yun Zhou**

Title: Research Associate
Expertise: Model Updating, Structural Identification
Ph.D: Hunan University
Employment: September 2008 to present
Current Funding: Full

2. **Dr. Jian Zhang**

Title: Research Assistant Professor
Expertise: Signal processing, Artificial Neural Networks, Genetic Algorithms
Ph.D: Kyoto University
Employment: December 2008 to present
Current Funding: Full

Ph.D. Students Supervised

1. **Ehsan Minaie**

Thesis Title: Seismic response and vulnerability of concrete masonry buildings
Expected graduation: Degree Award Winter 2010
Funding: Full

2. **Jeffrey Weidner**

Thesis Title: Identification of Modeling Omission through Multiple Model
Expected graduation: Spring/Summer 2011 (Passed Candidacy Exam)
Funding: Full

3. **Nathaniel Dubbs**

Thesis Title: Multiple Model Structural Identification
Expected Graduation: Spring/Summer 2011 (Passed Candidacy Exam)
Funding: Full

4. **Michael C. Mota**

Thesis Title: The influence of bias uncertainties on the use of small-scale physical models to examine the dynamic behavior of constructed systems
Expected graduation: Winter 2011 (Passed Candidacy Exam)
Funding: Partial

5. **Mathew Yarnold**

Thesis Title: TBD
Expected graduation: 2013
Funding: None

6. **Adrienne Deal**

Thesis Title: TBD
Expected Graduation: 2014
Funding: Full

Ph.D. Students Co-Supervised

1. **John Prader**
Thesis Title: Influence of data quality on uncertainty in system identification of bridges
Expected graduation: Winter 2011 (Passed Candidacy Exam)
Primary Advisor: Dr. A. Emin Aktan
2. **John Devitis**
Thesis Title: TBD
Expected Graduation: 2014
Primary Advisor: Dr. A. Emin Aktan

M.S. Students Supervised

1. **Shao-Yung Chen**
Thesis Title: A macroelement for the nonlinear analysis of in-plane unreinforced masonry piers
Degree: Spring 2007

Undergraduate Students Supervised

1. **Thomas Goleck** (Drexel University)
Project: Bond strength between FRP reinforcement and unreinforced masonry
Sponsor: Pennoni Honors College STAR Scholars Program
Year: 2004
2. **Nathan Dubbs** (Drexel University)
Project: Bond strength between FRP reinforcement and unreinforced masonry
Sponsor: NSF REU Engineering Cities (PIs: Dr. Joseph Wartman and Patricia Gallagher)
Year: 2006
3. **Mark Donovan** (Drexel University)
Project: Similitude of 1/3-scale concrete masonry units
Sponsor: Pennoni Honors College STAR Scholars Program
Year: 2007
4. **Edward Gormley** (Drexel University)
Project: Similitude of 1/3-scale diagonal tension masonry assemblages
Sponsor: Pennoni Honors College STAR Scholars Program
Year: 2007
5. **Jordan Reimer** (Oregon Institute of Technology)
Project: Similitude requirements for 1/3-scale concrete masonry units
Sponsor: NSF REU Engineering Cities (PIs: Dr. Joseph Wartman and Patricia Gallagher)
Year: 2007
6. **Kelly Shanahan** (University of Massachusetts Amherst)
Project: Finite element modeling of the Throgs Neck suspension bridge
Sponsor: NSF REU Engineering Cities (PIs: Dr. Joseph Wartman and Patricia Gallagher)
Year: 2008

7. **Katherine Sitter** (Drexel University)
Project: Geometric modeling of the Tacony-Palmyra Bridge
Sponsor: Pennoni Honors College STAR Scholars Program
Year: 2009

High School Students Supervised

1. 2009 **Stephanie Sparaco**, COE Summer Mentorship Program
2. 2009 **Melissa Mercado**, COE Summer Mentorship Program
3. 2009 **Charles Kokolskyj**, COE Summer Mentorship Program
4. 2009 **Andrew Lopes**, COE Summer Mentorship Program
5. 2008 **Jared Katz**, COE Summer Mentorship Program
6. 2007 **Tadele Dimisse**, COE Summer Mentorship Program

High School Teachers Supervised

1. **Edward Wright** (Moorestown High School)
Project: Introduction to earthquake engineering
Sponsor: NSF RET Program
Year: 2007

OTHER Ph.D. THESIS AND EXAMINATION COMMITTEES

1. **Abu Nasim**
Thesis Title: Mechanisms of seismically induced deformation in slopes and embankments
Graduation: Summer 2005
Advisor: Dr. Joseph Wartman
2. **Songtao Liao**
Thesis Title: Physical characterization of seismic ground motion spatial variation and conditional simulation for performance-based design
Graduation: Summer 2006
Advisor: Dr. Aspa Zerva
3. **Lei Lou**
Thesis Title: Effect of the spatial variability of ground motions on the seismic response of reinforced concrete highway bridges
Graduation: Fall 2006
Advisor: Dr. Aspa Zerva
4. **Qin Pan**
Thesis Title: System identification of constructed civil engineering structures and uncertainty
Graduation: Winter 2008
Advisor: Dr. A. Emin Aktan
5. **Robert Brehm**
Thesis Title: Engineering of rapidly deployable infrastructure for catastrophic recovery
Graduation: Winter 2008
Advisor: Dr. Joseph Martin

6. Fatma Ozkahrman

Thesis Title: Physical and numerical dynamic response modeling of slopes and embankments

Graduation: Spring 2009

Advisor: Dr. Joseph Wartman

7. Alex Waldman

Thesis Title: TBD

Graduation: 2012 (Passed Candidacy Exam)

Advisor: Dr. Franco Montalto

LABORATORY DEVELOPMENT ACTIVITIES

1. Revamped the Structural Engineering Laboratory within the Frederic O. Hess Laboratory complex. This included bringing the three high-capacity servo-hydraulic actuators up to working condition, purchasing and implementing a new servo controller capable of hybrid testing, purchasing and installing a new clevis, and the needed replacement of hoses and servo-valves.
2. Oversaw the relocation of the Drexel Intelligent Infrastructure Lab from Drexel One Plaza to 073 Alumni Engineering Laboratory. Secured internal funding to develop a hands-on mechanics laboratory (within the Intelligent Infrastructure Lab) complete with several idealized structural members, high-speed data acquisition capabilities, and an array of sensors.

SERVICE ACTIVITIES***Drexel University***

Member – CAEE Department Civil Engineering Faculty Search Committee (2010)

Member – CAEE Department CQI Committee (2010)

Member – CAEE Department Operations Committee (2010)

Member – CAEE Department Architectural Engineering Faculty Search Committee (2009)

Member – CAEE Department Civil Engineering Faculty Search Committee (2009)

Member – CAEE Department Graduate Committee (2004-2009)

Advisor – CAEE Department BS/MS Structural Engineering Program (2004-2009)

Member – CAEE Department Auxiliary Faculty Search Committee (2006)

Mentor – College of Engineering Summer Mentorship Program (2005, 2006, 2008, 2009)

Advisor – Drexel University STARR Program (2004, 2006, 2008, 2009)

National and International Service

Secretary – ASCE-SEI Structural Identification of Constructed Systems Committee (2006-present)

Secretary – Seismic Subcommittee, 2011 MSJC Building Code (2007-present)

Member – AAC Subcommittee, 2011 MSJC Building Code (2007-present)

Member – TMS Existing Masonry Committee (Chair – FRP Task Group) (2004-2007)

Member – TMS Research Committee (2004-2009)

Panelist – National Science Foundation, CMMI division (5 panels)

Reviewer – ASCE Journal of Structural Engineering; ASCE Journal of Engineering Mechanics; ACI Structures Journal; Journal of Thermoplastic Composite Materials; Earthquake Spectra, EERI; The Masonry Society Journal

Membership in Professional Societies

American Society of Civil Engineers