

GILSON RESCOBER LOMBOY

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Department of Civil and Environmental Engineering

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Rowan University

136 Rowan Hall, 201 Mullica Hill Road, Glassboro, New Jersey 08028

Education

PhD (2012): Civil Engineering Materials, Iowa State University, USA

Dissertation: *Particle Interaction and Rheological Behavior of Cement-Based Materials at Micro- and Macro-scales*

DEng (2007): Structural Engineering, Asian Institute of Technology, Thailand

Dissertation: *A Quasi-Conforming Shell Element for Geometric and Material Nonlinearity*

MEng (2002): Structural Engineering, Asian Institute of Technology, Thailand

Thesis: *Dynamic Analysis of Large Deformation Shells*

BS (1995): Civil Engineering, Mapua Institute of Technology, Philippines

Professional Registration

Registered Professional Engineer, Philippines

Research Interests

Concrete durability, Concrete workability and rheology, Concrete nanotechnology (modification and characterization), Self-Consolidating Concrete, Sustainable concrete materials, Finite Element Methods, Nonlinear analysis of structures, Mechanics of laminate composites

Awards

Teaching Excellence Award, Iowa State University, 2012

International Road Federation Road Scholar Program - Executive Fellow, 2011

Asian Institute of Technology – 3-term fellowship 2000-2001

Professional Regulation Commission of the Philippines BSCE Licensure Exam—4th place/3000, 1995

Past and Present Posts

Assistant Professor,

Rowan University (2016-Present)

Postdoctoral Fellow,

Civil, Construction and Environmental Engg, Iowa State University, USA (2013-2016)

Civil and Environmental Engineering, Northwestern University, USA (2012-2013),

Research and Teaching Assistant,

Civil, Construction, and Environmental Engg, Iowa State University, USA (2007- 2012)

Research Associate,

Asian Institute of Technology, Thailand (2002-2007)

Head and Structural Engineer, Engineering Department,

Tecphil Inc. Architects-Engineers-Construction Managers, Philippines (1997- 2000)

Civil Engineer,

Tecphil Inc. Architects-Engineers-Construction Managers, Philippines (1996-1997)

Laboratory Assistant,

Hydraulics Department, Mapua Institute of Technology, Philippines (1993- 1994)

Teaching Experience

Courses Taught – Rowan University

Undergraduate Courses

- CEE 301, Civil Engineering Materials
- CEE 484, Prestressed Concrete for Seniors
- CEE 474, Structural Mechanics

Graduate Courses

- CEE 584, Prestressed Concrete
- CEE 574, Advanced Structural Mechanics

Courses Taught and Assisted – Iowa State University

Undergraduate Courses

- CE 382, Design of Concretes (Instructor and TA);
- CE 383, Design of Portland Cement Concrete (TA);

Graduate Courses

- CE 587, Advanced Portland Cement Concretes (TA);
- CE 584, Advanced Design of Concretes (TA).

Student Supervision

Rowan University

1. Seth Wagner, Ternary Blended Concrete with Recycled Concrete Aggregates, 2017-, (MS student)
2. Harsh Pandya, Repair of high performance concrete using Ultra-High Performance Concrete, 2016-. (Ph.D. student)

Iowa State University

3. T. Li, Review of Admixture Modification of Concrete to Mitigate Shrinkage Cracking: Shrinkage Reducing, Shrinkage Compensating and Internal Curing, 2015 (CE490 Independent Study, undergraduate student)
4. W. Cai, Study on Particle Packing Effect on High Strength Mortar for Concrete Repair, 2015 (CE590 Independent Study, graduate student)
5. J. Davis, Bond Behavior of High Strength Concrete on Normal Strength and High Strength Concrete Substrates, 2015 (CE490 Independent Study, undergraduate student)

6. B. Lian, Effects of Autogenous Healing on Cyclic Freezing-Thawing of Normal and High Strength Concrete, 2015 (CE590 Independent Study, graduate student)
7. B. Mo, Effects of Fine Materials on Concrete Rheology, 2014 (CE590 Independent Study, graduate student)
8. D. Fliehler, Measurement of Formwork Pressure due to SCC, 2011 (CE490 Independent Study, undergraduate student)
9. P. Sun, The Effects of Time, Temperature and Set Modifying Admixtures on the Rheology of Cementitious Mortars, 2011 (CE490 Independent Study, undergraduate student)
10. C. Norris, Statistical Analysis of Concrete Rheology Data, 2011 (CE490 Independent Study, undergraduate student)

List of Publications

Journal Publications (19, +1 submitted)

1. **G.R. Lomboy** and K. Wang, Mechanical Properties of High Performance Mortar for Rapid Concrete Repair, Journal of Engineering Mechanics (submitted)
2. **G.R. Lomboy**, F. Bektas, and K. Wang, Extended Use of Limestone Fines in Various Concretes, Journal of Civil Engineering and Architecture 10(9):995-1005, 2016
3. **G.R. Lomboy** and K. Wang, Semi-Flowable Self-Consolidating Concrete and its Application, International Journal of Materials and Structural Integrity, 9(1-3):61-71, 2015.
4. S.P. Shah and **G.R. Lomboy**, Future Research Needs in Self-Consolidating Concrete, Journal of Sustainable Cement-Based Materials, DOI:10.1080/21650373.2014.956238, 2014.
5. Z. Quanji, **G.R. Lomboy**, K. Wang, Influence of Nano-Sized Highly Purified Magnesium Alumino Silicate Clay on Thixotropic Behavior of Fresh Cement Pastes, Construction & Building Materials, 69:295-300, 2014.
6. **G.R. Lomboy**, X. Wang and K. Wang, Rheological Behavior and Formwork Pressure of SCC, SFSCC and NC Mixtures, Cement and Concrete Composites, 54:110-116, 2014.
7. **G.R. Lomboy**, S. Sundararajan, K.Wang, Micro- and macroscale coefficients of friction of cementitious materials, Cement and Concrete Research 54:21–28, 2013.
8. **G.R. Lomboy**, K. Wang, P. Taylor and S.P. Shah, Guidelines for design, testing, production and construction of semi-flowable SCC for slip-form paving, International Journal of Pavement Engineering, 13(3):216-225, 2012.
9. **G.R. Lomboy**, K. Wang and Z. Quanji, Properties of Cementitious Materials in Their Dry State and Their Influence on Viscosity of the Cementitious Pastes, Powder Technology, 229:104-111, 2012.
10. **G.R. Lomboy**, S. Sundararajan, K. Wang and S. Subramaniam, A test method for determining adhesion forces and Hamaker constants of cementitious materials using atomic force microscopy, Cement and Concrete Research, 41(11):1157-1166, 2011.
11. **G.R. Lomboy**, K. Wang and C. Ouyang, Shrinkage and Fracture Properties of Semi-flowable Self Consolidating Concrete, ASCE Journal of Materials in Civil Engineering, 23:1514-1524, 2011.

12. **G.R. Lomboy**, S. Suthasupradit, K.D. Kim, and E. Oñate, Nonlinear Formulations of a Four-Node Quasi-Conforming Shell Element, Archives of Computational Methods in Engineering, 16(2):189-250, 2009.
13. **G.R. Lomboy** and K. Wang, Effects of Strength, Permeability, and Air Void Parameters on Freezing-Thawing Resistance of Concrete With and Without Air Entrainment, Journal of ASTM International, 6(10):14, 2009.
14. S.C. Han, **G.R. Lomboy**, K.D. Kim, Mechanical Vibration and Buckling Analysis of FGM Plates and Shells Using a Four-Node Quasi-Conforming Shell Element, International Journal of Structural Stability and Dynamics, 8(2):203-229, 2008.
15. K.D. Kim , **G.R. Lomboy**, S.C. Han, Geometrically Non-linear Analysis of Functionally Graded Material (FGM) Plates and Shells using a Four-node Quasi-Conforming Shell Element, Journal of Composite Materials, 42(5):485-511, 2008.
16. **G.R. Lomboy**, K.D. Kim and E. Oñate, A Co-rotational 8-node Resultant Shell Element for Progressive Nonlinear Dynamic Failure Analysis of Laminated Composite Structures, Mechanics of Advanced Materials and Structures, 14:89-105, 2007.
17. K.D. Kim, Y.J. Byun, H.K. Kim, **G.R. Lomboy**, S. Suthasupradit, Y.H. Kim, Development of Quasi-Conforming Shell Element for the Three Dimensional Construction Stage Analysis of PSC Bridge (in Korean), Journal of the Computational Structural Engineering Institute of Korea, 20(3):329-338, 2007.
18. K.D. Kim and **G.R. Lomboy**, A Co-rotational Quasi-Conforming 4-Node Resultant Shell Element for Large Deformation Elasto-Plastic Analysis, Computer Methods in Applied Mechanics and Engineering, 195:6502-6522, 2006.
19. K.D. Kim, **G.R. Lomboy** and S.C. Han, A Co-rotational 8-Node Assumed Strain Shell Element for Post Buckling Analysis of Laminated Composite Plates and Shells, Computational Mechanics, 30(4):323-329, 2003.
20. K.D. Kim, **G.R. Lomboy** and G.Z. Voyiadjis, A 4-Node assumed Strain Quasi-Conforming Shell Element with 6 Degrees of Freedom, International Journal for Numerical Methods in Engineering, 58(14):2177-2200, 2003.

Reports (5)

1. K. Wang and **G.R. Lomboy**, Developing Green, Highly Flowable, Rapid Set, High-Performance Concrete for Pavement Patch Repair, National Concrete Pavement Technology Center, Institute of Transportation, Iowa State University, 2016
2. K. Wang, S.P. Shah, X. Wang, N. Garg, **G.R. Lomboy**, S. Kawashima, P. Hou, Increasing Use of Fly Ash in Concrete through Nanomaterial Modification, Multiscale Characterization, and Improved Processing, Oak Ridge Associated Universities, Tennessee Valley Authority, Grant No. 7-22976
3. K. Wang, S.P. Shah, P. Taylor, J. Grove, P. Wiegand, R. Steffes, **G.R. Lomboy**, Z. Quanji, L. Gang, N. Tregger, Self-Consolidating Concrete-Applications for Slip-Form Paving: Phase II. National Concrete Pavement Technology Center, Institute of Transportation, Iowa State University, 2011.

4. K. Wang, **G.R. Lomboy** and R. Steffes, Investigation into Freezing-Thawing Durability of Low-Permeability Concrete with and without Air Entraining Agent, National Concrete Pavement Technology Center, Institute of Transportation, Iowa State University, 2009.
5. **G.R. Lomboy**, Non-Linear Dynamic Analysis of Composite Shells with Ply Failure, Pathum Thani, Thailand: School of Civil Engineering, Asian Institute of Technology, 2002

Special Publications (4)

1. S.C. Han, I. Kreja, G. Rus, **G.R. Lomboy**, Editorial to Special Issue on Structural Dynamics and Stability of Composite Structures, Advances in Materials Science and Engineering, <http://dx.doi.org/10.1155/2016/7468181>, 2016
2. K. Wang and **G.R. Lomboy**, Editorial to Special Issue on Recent advances in constituent materials of self-consolidating concrete, Editorial, Journal of Sustainable Cement-Based Materials, <http://dx.doi.org/10.1080/21650373.2014.975428>, 3(3-4):166,2014
3. S.P. Shah, S. Kawashima, W. Li and **G.R. Lomboy**, Controlling Properties Of Concrete Through Nanomodification, in Nanotechnology and Sustainability in Construction, Proceedings of the FraMCoS-8/30GEF Workshop held in Toledo Spain, S.P. Shah, G. Ruiz, R.C. Yu, X.X. Zhang, C. Andrade (Eds), International Center for Numerical Methods in Engineering (CIMNE), Barcelona, Spain, 2013
4. **G.R. Lomboy** and K. Wang, Effects of Strength, Permeability, and Air Void Parameters on Freezing-Thawing Resistance of Concrete With and Without Air Entrainment, in Journal of ASTM International Selected Technical Papers STP1511, Recent Advances in Concrete Freezing-Thawing (F-T) Durability, K. Wang (Ed), ASTM International 2010.

List of Research Projects (11)

Investigator

1. Evaluation of Precast Concrete Pavement System and Cast In-Place (Sponsor: New Jersey Department of Transportation, awarded)
2. Long-Term Performance of Sustainable Pavements using Ternary Blended Concrete Mixtures with Recycled Concrete Aggregates (Sponsor: U.S. Army Corps of Engineers, 2017-2019, \$159,955)
3. Bridge Resource Program (Sponsor: New Jersey Department of Transportation, 2017-2021, \$100,084)
4. Investigation into Shrinkage of High Performance Concrete Used for Iowa Bridge Decks and Overlays – Phase II Shrinkage Control and Field Investigation (Sponsor: Iowa Highway Research Board, 2015-2018, \$299,993)
5. Developing Green, Highly Flowable, Rapid Set, High Performance Concrete for Pavement Patch Repair (Sponsor: Midwest Transportation Center, 2014-2016, \$150,000)
6. Transforming Traditional Lab Instruction to Blended Instruction Through Computer-Mediated Activities (Sponsor: Computation Advisory Committee and Civil, Construction and Environmental Engineering Department, 2012-2013, \$17,400)

7. Entrained Air Void System for Durable Highway Concrete, National Cooperative Highway Research Program (NCHRP) Project Number 18-17 (Sponsor: Transportation Research Board (TRB), 2015-2018, \$599,986)

Primary Graduate Researcher

8. Understanding Rheology of Cement-Based Materials Through Integrated Experiments And Computations At Multiple Scales (Sponsor: National Science Foundation Grant No. 0927660, 2009-2012, \$300,000)
9. Self-Consolidating Concrete - Applications For Slip-Form Paving: Phase II (Sponsors: FHWA, State Department of Transportation (DOT), and Industry-Pooled Fund, 2007-2010, \$367,731)
10. Investigation into Freezing-Thawing Durability of Concrete with and without Air Entraining Agent (Sponsor: Iowa Department of Transportation, 2008-2009)
11. XFINAS – Nonlinear Dynamic Analysis Software Development (Sponsor: Asian Institute of Technology/Konkuk University, 2002-2007)

List of Projects with Detailed Engineering Design Involvement*

Structural Design

1. Seven-Storey Pedia Wards Building, National Children's Hospital – Prepared the structural design.
2. Twin Registry of Deeds Building, Laoag City – Prepared the structural design and civil works, signatory to plans
3. Registry of Deeds Building, Bayombong, Nueva Viscaya – Prepared the structural design and civil works, signatory to plans.
4. Italtel Telecommunications Exchange/Transmission Buildings – Prepared the structural design and civil works, signatory to plans. Supervised the preparation of architectural drawings, mechanical and electrical plans. Signatory to structural and civil works plans
5. Packing Plant and Bag Loading Plant, Republic Cement Corporation – Prepared the structural design, drawings and details of connections
6. Resurrection of Our Lord Parish Church – Assisted in the structural design.
7. 40 Meter Eastridge Tunnel Bridge – Assisted in the re-design of tunnel and performed periodic inspection during the implementation stage.

Civil Works Design

8. 1.17 Ha. Site Development along Kalayaan Ave. – Responsible for the detailed engineering design, site grading, road network, water, drainage and sewer systems, and corresponding design reports. Signatory to road network and drainage system plans.

* All projects were conducted in the Philippines.

9. Four Relocation Sites within the 48-Hectare BCDA property – Responsible for the detailed engineering design, site grading, road network, water, drainage and sewer systems, and corresponding design reports. Signatory to road networks and drainage system plans.
10. BCDA Funded CAPEX Project (Package II), (1) Construction of Industrial Estate V Development Road, (2) Renovation of CSEZ Gates, (3) Repair and Restoration of Damaged Perimeter Fence, (4) Installation of Traffic Lighting – Prepared the detailed engineering design, signatory to plans.
11. New College of Arts and Sciences Building, UP Los Baños – Prepared civil works design and signatory to the plans.

List of Projects with Construction Management Involvement*

1. Seven-Storey Pedia Wards Building, National Children's Hospital – Quality control, schedule monitoring, progress reporting.
2. Barangay West Crame Main Health Center and Lying-in Clinic – Quality control, schedule monitoring, progress reporting.
3. Las Piñas City Main Health Center – Quality control, schedule monitoring, progress reporting.
4. Pasay City Health Center – Quality control, schedule monitoring, progress reporting.
5. Muntinlupa Health Center – Quality control, schedule monitoring, progress reporting.

Public Engagement

Conference, Symposium and Proceedings (22)

1. Y. Ling, K. Wang, and G. Lomboy, Shrinkage Cracking Control on High Performance Concrete (HPC) Used for Iowa Bridge Decks and Overlays, Mid-Continent Transportation Research Symposium, Ames, IA August 16–17, 2017
2. J. Davis, G.R. Lomboy, K. Wang, Bond Strength and Failure Mode of New Green High Performance Patching Material, Mid-Continent Transportation Research Symposium, Ames, IA August 19–20, 2015
3. W. Cai, K. Wang, G. Lomboy, Study on Particle Packing Effect on High Strength Mortar for Concrete Repair, Mid-Continent Transportation Research Symposium, Ames, IA August 19–20, 2015
4. G.R. Lomboy, J. Ren, A. Cheng, L. Bo, K. Wang, Mechanical and Durability Properties of High Performance Mortar for Concrete Pavement Repair, Mid-Continent Transportation Research Symposium, Ames, IA August 19–20, 2015
5. G.R. Lomboy, K. Wang and S. Sundararajan, Nanoscale Characterization of Cementitious Materials, in Nanotechnology in Construction, Proceedings of NICOM5, K. Sobolev and S.P. Shah, editors, Springer Switzerland, NICOM5 Fifth International Symposium on Nanotechnology in Construction, Chicago, May 24-26, 2015. https://doi.org/10.1007/978-3-319-17088-6_5

6. G.R. Lomboy, D. Isheim and S.P. Shah, Atom Probe Tomography for Nanomodified Portland Cement, in Nanotechnology in Construction, Proceedings of NICOM5, K. Sobolev and S.P. Shah, editors, Springer Switzerland, NICOM5 Fifth International Symposium on Nanotechnology in Construction, Chicago, May 24-26, 2015. https://doi.org/10.1007/978-3-319-17088-6_9
7. K. Wang and G.R. Lomboy, Nanoparticle modified Concrete Materials: Opportunities, Challenges and Prosperities, in Proceedings of the First International Conference on Construction Materials and Structures, S.O. Ekolu, M. Dundu and X. Gao, editors, Johannesburg, South Africa, 24-26 November 2014, IOS Press BV, Netherlands <https://doi.org/10.3233/978-1-61499-466-4-16>
8. E. Murphy, G.R. Lomboy, K. Wang, S. Sundararajan, S. Subramaniam, Homogeneous shear simulations of liquid-solid suspensions of attractive microparticles. Proceedings of the 14th AIChE Annual Meeting, Atlanta, GA, November 16-21 2014.
9. K. Wang, S. Shah, R. Breitenbuecher and G.R. Lomboy, Design, Properties, and Performance of Semi-Flowable Self-Consolidating Concrete – An Overview, SCC2014 - The Third International Symposium on Design, Performance and Use of Self-Consolidating Concrete, Xiamen, China, June 5-8, 2014
10. S.P. Shah and G.R. Lomboy, Future Research Needs in Self-Consolidating Concrete, SCC2014 - The Third International Symposium on Design, Performance and Use of Self-Consolidating Concrete, Xiamen, China, June 5-8, 2014
11. G.R. Lomboy, X. Wang and K. Wang, Rheological Behavior and Formwork Pressure of SCC, SFSCC and NC Mixtures, SCC2013 - The Fifth North American Conference on the Design and Use of Self-Consolidating Concrete, Chicago, May 12-15, 2013
12. G.R. Lomboy and K. Wang, Flow Properties of Cementitious Powders in its Dry State, Gordon Research Conference on Granular & Granular-Fluid Flow, Davidson College, Davidson, North Carolina, July 22-27, 2012
13. G.R. Lomboy, K. Wang, S. Sundararajan and S. Subramaniam, Systematic Study of the Rheology of Cementitious Pastes, NSF CMMI Engineering Research and Innovation Conference, July 9-12, 2012
14. K. Wang, S. Sundararajan, S. Subramaniam and G.R. Lomboy, Particle Interaction and Rheology of Cement-Based Materials, NSF CMMI Engineering Research and Innovation Conference, July 9-12, 2012
15. G.R. Lomboy, K. Wang, P. Taylor and S.P. Shah, Guidelines for Design, Testing, Production and Construction of Semi-Flowable SCC for Slip-Form Paving, Mid-Continent Transportation Research Symposium, Ames, IA, August 2011.
16. K. Wang, S. P. Shah, G.R. Lomboy and G. Lu, Self-Consolidating Concrete for Slip-Form Construction: Field Application and Performance Monitoring, 9th International Symposium on High Performance Concrete - Design, Verification & Utilization, Rotorua, New Zealand, August 2011.
17. G.R. Lomboy, K. Wang, P.C. Taylor, S.P. Shah, J.D. Grove and P. Wiegand, , Economic and Environmental Benefits of Using Semiflowable Self-Consolidating Concrete for Slip-Form

Paving, Transportation Research Board 90th Annual Meeting, Washington, DC, January 23-27, 2011.

18. K. Wang, S. Sundararajan, S. Subramaniam and G.R. Lomboy, A Test Method for Determining Adhesion Forces and Hamaker Constants of Cementitious Materials Using Atomic Force Microscopy, NSF Engineering Research and Innovation Conference, Atlanta, GA, January 4-7, 2011.
19. G.R. Lomboy, S. Sundararajan, K. Wang and S. Subramaniam, An Atomic Force Microscope-Based Technique to Determine Hamaker Constants of Finely Ground Materials, 47th Annual Technical Meeting of Society of Engineering Science, Iowa State University, Ames, IA, October 2010.
20. G.R. Lomboy and K. Wang, Freeze-Thaw Durability of Low Permeability Concrete, ACI Convention, San Antonio, TX, Spring 2009.
21. G.R. Lomboy, S. Sundararajan, S. Subramaniam and K. Wang, Determining Portland Cement Adhesion Forces and Hamaker Constant Using Atomic Force Microscopy, Complex Fluid Systems Workshop, Iowa State University, Ames IA, 2009.
22. D. Van Nguyen, K.D. Kim, S. Suthasupradit, Y.H. Kim, G.R. Lomboy, New development of XFINAS software for nonlinear dynamic and seismic analysis of structures, 3rd Asian-Pacific Congress on Computational Mechanics (APCOM'07) in conjunction with the 11th International Conference on the Enhancement and Promotion of Computational Methods in Engineering and Science (EPMESC XI), Kyoto, Japan, 2007, Paper No. GS-8.2
23. K.D. Kim, G.R. Lomboy, Y.J. Byun and J.H. Choi, Nonlinear Structural Dynamic Analysis Using XFinas With GiD, 2nd Conference on Advances and Applications of GiD, Barcelona, Spain, 2004.

Web Based Experiments

1. <http://www.ccee.iastate.edu/ce382/> - an existing lab course was transformed into a blended online learning and actual application. Online videos and exams were created for lab activities and experiments. The physical activities were done upon passing the online exams. The lab activities and experiments are as follows:
 - Specific Gravity and Absorption of Fine and Coarse Aggregates (ASTM C127 & 128)
 - Dry Rodded Unit Weight and Void in Coarse Aggregate (ASTM C29)
 - Temperature Measurement during Cement Hydration
 - Compressive Strength of Cement Paste (ASTM C305, C109, C186)
 - Concrete materials batching and mixing (ASTM C192)
 - Testing of hardened concrete beams and cylinders (ASTM C617, C78)
 - Self-consolidating concrete mixing and testing (ASTM C1611, C1621)

Invited Reviewer and Guest Editor

1. Guest Editor, “Structural Dynamics and Stability of Composite Structures”, Advances in Materials Science and Engineering, 2016
2. Guest Editor, “Recent Advances In Constituent Materials of Self-Consolidating Concrete”, Journal of Sustainable Cement-Based Materials, 2014
3. Advances in Civil Engineering Materials, ASTM International

4. Cement & Concrete Composites, Elsevier Ltd
5. Computer Modeling in Engineering & Sciences, Tech Science Press
6. Frontiers of Structural and Civil Engineering, Springer
7. Fuel, Elsevier Ltd
8. Journal of Materials in Civil Engineering, ASCE
9. Journal of Sustainable Cement-Based Materials, Taylor & Francis
10. Mechanics of Advanced Materials and Structures, Taylor & Francis
11. Proceedings of NICOM5, Review Committee, Springer