

Michael V. Gangone, Ph.D., E.I.T.

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Curriculum Vitae

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EDUCATION

- Ph.D. Civil & Environmental Engineering Clarkson University 2012
Dissertation: "Framework for In-service Bridge Health Assessment using Quantitative Measures"
Advisors: Professor Kerop Janoyan and Professor Levon Minnetyan
- M.S. Civil Engineering Clarkson University 2006
Thesis: "Design and Monitoring of a Full-Scale Fiber Reinforced Polymer (FRP) Reinforced Concrete Bridge Superstructure"
Advisors: Professor Kerop Janoyan and Professor Levon Minnetyan
- B.S. Civil Engineering (with distinction) Clarkson University 2005
Minor: Mathematics

EXPERIENCE

Assistant Professor, Department of Civil Engineering, University of Texas at Tyler (August 2012 – present)

Post-Doctoral Research Associate, Department of Civil and Environmental Engineering, Clarkson University (May 2012 – August 2012)

Graduate Research/Teaching Assistant, Department of Civil and Environmental Engineering, Clarkson University (June 2005 – May 2012)

CERTIFICATIONS

Licensed Engineer in Training New York State (EIT) 2005-present
American Concrete Institute (ACI) Concrete Field Testing Technician – Grade 1 2004-2009

RESEARCH EXPERIENCE

Development of In-Service Monitoring Tools for Long-Span Bridges Using Advanced Sensor Networks

Status: Selected for funding

Sponsor: University Transportation Research Center (UTRC)

Role: Co-PI (PI's: Prof. Kerop Janoyan, Prof. Pier Marzocca, and Prof. Levon Minnetyan)

Amount: \$75,000

Brief: This project focuses on the developing sensors and methodology for monitoring long span bridges in particular suspension bridges. It is proposed to implement the developed assessment tools on an in-service long span suspension bridge which has significant

importance to New York State. The system will be deployed on the bridge for a period of time to measure the response and quantify any change in performance.

Long-Term In-Service Monitoring of the Ogdensburg-Prescott International Bridge Suspension Cables Using Advanced Wireless Sensor System

Status: Pending

Sponsor: Federal Highway Administration (FHWA) and Ogdensburg Bridge and Port Authority

Role: Co-PI (PI's: Prof. Kerop Janoyan and Prof. Pier Marzocca)

Amount: \$420,000

Brief: This project focuses on the deployment of a combination of wired and wireless sensors on the Ogdensburg-Prescott International Bridge which connects New York State with Canada. An inspection of the main cables of the suspension bridge revealed some corrosion near the surface. The main cables are composed of bundle of steel wires. The focus of this work will be to deploy a long-term monitoring system to evaluate the structural health and integrity of the fracture critical main cables.

Condition Assessment of Bridges using Advanced Sensor Networks

Status: Ph.D. research topic

Role: Graduate student researcher (Advisors: Prof. Kerop Janoyan and Prof. Levon Minnetyan)

Period: January 2007-May 2012

Brief: Develop a method of quantitative condition assessment for highway bridges to complement existing bridge inspection protocols. Based on various strain based load testing parameters gathered from numerous field tests, a *performance index* will be established. The *performance index* will be similar to a condition rating number which is currently based solely on qualitative assessment. The goal is to allow bridge inspectors to implement advanced sensor technologies during their routine inspection, thus providing rapid quantitative assessment into the bridge performance. The information can then be incorporated into the Bridge Management System (BMS).

Innovative Bridge Research and Development Program: CR55 Bridge Replacement

Status: Completed

Sponsors: Federal Highway Administration (FHWA) Innovative Bridge Research and Deployment (IBRD) Program

Role: Graduate student researcher (PI's: Prof. Kerop Janoyan and Prof. Levon Minnetyan)

Period: November 2009-October 2010

Brief: Completed multiple field investigations of a composite steel girder and Fiber Reinforced Polymer (FRP) bridge deck panel superstructure. Wireless sensor technology developed in the Laboratory for Intelligent Infrastructure and Transportation Technology (LIITT) at Clarkson University was deployed to acquire both the strain and modal response of the structure under ambient and controlled loading. Two full scale load tests of the bridge superstructure from real-time strain measurements were completed where the results were compared to determine any changes in bridge performance over the one year service life of the bridge.

Bridge Monitoring Program

Status: Completed

Sponsors: General Electric (GE), Lockheed Martin, and NYSTAR Center for Advanced Material Procession (CAMP)

Role: Graduate student researcher (PI: Prof. Kerop Janoyan)

Period: June 2008-June 2009

Brief: An in-depth field investigation of an end-of-service life highway bridge was completed using custom developed wireless sensor technology. The superstructure was monitored for both strain and acceleration response. A full scale wireless load test of the three-span bridge using test trucks of known weight was undertaken to provide a load rating. Operational modal analysis was performed over multiple days. On the final day of testing, controlled progressive damage was introduced at various locations of a single span to determine if the sensor measurements and developed methodologies could detect the damage.

Innovative Bridge Research and Construction Program: White Creek CR68 over Little White Creek Bridge Replacement

Status: Complete (M.S. Thesis)

Sponsors: Federal Highway Administration (FHWA) Innovative Bridge Research and Construction (IBRC) Program

Role: Sole graduate student researcher (PI's: Prof. Levon Minnetyan and Prof. Kerop Janoyan)

Period: June 2005-June 2007

Brief: Project involved the design and monitoring of a bridge superstructure with integrated Carbon Fiber Reinforced Polymer (CFRP) rebar in a reinforced concrete bridge deck located in White Creek, NY. Included with the design were the complete superstructure drawings along with the material inventory list for various design options. This project involved incorporating innovative materials into the design of the bridge superstructure for improving performance and increased service life. A performance monitoring system using Fiber Optic Sensors (FOS) technology was proposed to track the long term performance of the bridge while validating design methodologies. A developed wireless sensor technology system will be deployed externally on the superstructure for load testing at a later date.

Software Experience

AutoCAD, Maple, MATLAB, ALGOR, STAAD

HONORS AND AWARDS

- Clarkson University Outstanding Teaching Award for Graduate Students (2011-2012)
- Outstanding teaching award in the Coulter School of Engineering at Clarkson University (Fall 2008, Fall 2010, Spring 2011, Fall 2011, Spring 2012)
- 2011-2012 Department of Civil and Environmental Engineering Outstanding Teaching Award for Graduate Students
- Teaching Excellence in the Coulter School of Engineering (Fall 2010, Spring 2011)
- 2010-2011 Department of Civil and Environmental Engineering Outstanding Teaching Award for Graduate Students
- Invited Visiting Scholar at Cambridge University Engineering Department July 2009

- 2008-2009 Department of Civil and Environmental Engineering Outstanding Teaching Award for Graduate Students
- Dean's List for all eligible semesters of undergraduate studies
- Phalanx Commendable Service Award 2005
- ASCE Clarkson Chapter Student Service Award presented by Syracuse Section of ASCE 2005
- Chi Epsilon (National Honor Society for Civil Engineers)
- Pi Mu Epsilon (National Honor Society for Mathematics)
- University and Colleges Athletic Association (UCAA) All-Academic Team (2002-2004)
- Liberty League (athletic) All-Academic Team (2005-2006)

TEACHING EXPERIENCE

Spring 2011, Spring 2012

CE310: Geotechnical Engineering I – Soil Mechanics (Course and Laboratory Instructor)
 Instructor in charge. Developed lecture material, homework assignments, and examinations. Also instructed the laboratory component of the course.

Fall 2008, Fall 2010, Fall 2011

CE212: Introduction to Civil Engineering Design (Course Instructor)
 Instructed the structural engineering portion of the course. Improved the previous year's lab experiment as well as created a series of lectures, workshops and assignments. Developed a design project for students which allowed them to apply the design process incorporating engineering mechanics. For the fall 2011 semester, the class was restructured and a new project was introduced which had students completing a full-scale design of either a point of use water treatment system or a pedestrian bridge for a developing community in Ecuador. This was selected to complement the work being done by the university chapter of Engineers Without Borders (EWB).

Spring 2006, Spring 2007, Spring 2008, Spring 2011

CE310: Soil Mechanics (Laboratory Instructor/ Teaching Assistant)
 Responsibilities: Held office hours for students, instructed laboratory sessions, graded lab reports, guest lectured.

Laboratory: Instructed students through laboratory experiments the mechanical properties and behavior of soils. This lab allowed students the opportunity for a better understanding of the theory taught in lectures by means of visual and hands-on lab testing. Labs conducted include: Specific Gravity, Atterberg Limits, Grain Size Distribution, Proctor Compaction, Subsurface Exploration, Consolidation, Direct Shear, and Unconfined Compression.

Fall 2005

CE 415/515: Foundations Stability and Retaining Structures (Teaching Assistant)
 Responsibilities: Graded homework, held office hours for students, and guest lectured when instructor was unavailable.

Spring 2004 (senior year)

CE 421/521 & ME457/557: Mechanics of Composite Materials (Grader/Lab Instructor)

Responsibilities: Graded homework, instructed the lab experiments.

TEACHING EVALUATIONS

Semester	Course Number and Title	Number of Students in Class	Evaluation of Instructor	University Mean
Spring 2012	CE310: Soil Mechanics I	87	4.7/5.0*	4.3/5.0
Fall 2011	CE212: Introduction to Civil Engineering Design	91	4.7/5.0*	4.2/5.0
Spring 2011	CE310: Soil Mechanics I	75	4.4/5.0*	4.2/5.0
Fall 2010	CE212: Introduction to Civil Engineering Design	138	4.2/5.0*	4.2/5.0
Fall 2008	CE212: Introduction to Civil Engineering Design	108	4.4/5.0*	4.2/5.0
Spring 2008	CE310: Soil Mechanics (laboratory)	70	N/A	N/A
Spring 2007	CE310: Soil Mechanics (laboratory)	73	4.86/5.0**	N/A
Spring 2006	CE310: Soil Mechanics (laboratory)	53	4.62/5.0**	N/A

*University Evaluations

** Laboratory Evaluations

CLARKSON UNIVERSITY CONTINUING EDUCATIONAL WORKSHOP

Organizer of a Continuing Education workshop on *Resilient and Sustainable Infrastructure Systems* held in July 2007 at Clarkson University.

EXTRA-CIRRICULAR ACTIVITIES

2004-present Assist in open house demonstrations and activities

2001-present Member of Clarkson ASCE Student Chapter

2004-present Member Chi Epsilon

2002-2006 Clarkson University Golf Team

2004-2005 Organizer of ASCE Regional Conference held at Clarkson University April 2005

2001-2004 New York Water and Environment Association (NYWEA) Student Chapter
Officer, Treasurer: 2001-2003, Vice President: 2003-2004

2003-2004 American Society of Civil Engineering (ASCE) Student Chapter Treasurer

2003-2004 Civil Engineering Honor Society Chi Epsilon (XE) Student Chapter
Editor/Treasurer

MEMBERSHIP

- American Concrete Institute (ACI)
- American Society of Civil Engineers (ASCE)
- American Association for State and Highway Transportation Officials (AASHTO)
- Chi Epsilon (National Honor Society for Civil Engineers)
- Pi Mu Epsilon (Honor Society for Mathematicians)
- International Association for Life-Cycle Civil Engineering (IALCCE)
- International Association for Bridge Management and Safety (IABMAS)

PUBLICATIONS

Articles in Journals and Monographs

1. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. (2012). “Sensitivity analysis of the effect of sensor noise levels to load testing and condition assessment results,” *Journal of Civil Structural Health Monitoring*, under review.
2. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. (2012). “Experimental Characterization and Diagnostics of the Early-Age Behavior of a Semi-Integral Abutment FRP Deck Bridge,” *Journal of Sensor Review*, in press.
3. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. (2012). “Development of performance assessment tools for a highway bridge resulting from controlled progressive damage monitoring,” *Structure and Infrastructure Engineering: Maintenance, Management, Life-Cycle Design and Performance*, accepted for publication.
4. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2011). “Deployment of a Dense Hybrid Wireless Sensing System for Bridge Assessment,” *Structure and Infrastructure Engineering: Maintenance, Management, Life-Cycle Design and Performance*, 7(5) pp. 369-378.
5. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2011). “Wireless Monitoring of a Multispan Bridge Superstructure for Diagnostic Load Testing and System Identification,” *Computer Aided Civil and Infrastructure Engineering (CACIE)*, 26(7), pp. 560-579.
6. Whelan, M.J., **Gangone, M.V.**, Janoyan, K.D., and Jha, R. (2011). “Operational Modal Analysis of a Multi-Span Skew Bridge Using Real-Time Wireless Sensor Networks,” *Journal of Vibration and Control*, 7(13), pp. 1952-1963.
7. Whelan, M.J., **Gangone, M.V.**, Janoyan, K.D., Houtl, N.A., Middleton, C.R., and Soga, K. (2010). “Wireless Operational Modal Analysis of a Multi-Span Pre-stressed Concrete Bridge for Structural Identification,” *Smart Structures and Systems: Wireless Sensor Advances and Applications for Civil Infrastructure*, 6(5-6) pp. 579-593.
8. Whelan, M.J., **Gangone, M.V.**, Janoyan, K.D., and Jha, R. (2009). “Real-Time Wireless Vibration Monitoring for Operational Modal Analysis of an Integral Abutment Highway Bridge,” *Engineering Structures*, 31(2009) pp. 2224-2235.

9. Whelan, M.J., **Gangone, M.V.**, and Janoyan, K.D. (2009). "Highway Bridge Assessment using an Adaptive Real-Time Wireless Sensor Network," *IEEE Sensors Journal*, 9(11), pp 1405-1413.
10. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2008). "Structural Health Management of Concrete Structures using Wireless Sensors," *Health Monitoring Systems and Sensors for Assessing Concrete*, American Concrete Institute (ACI) Special Publication (SP-252).

Published Conference Proceedings

1. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2011). "Diagnostic Performance Indication through Field Testing of a bridge Superstructure," 8th International Workshop on Structural Health Monitoring, Stanford, CA, 13-15, September.
2. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2011). "Condition Assessment of a Damaged Bridge Superstructure Using Diagnostic Performance Indicators," *SPIE Smart Structures Symposium*, San Diego, CA, 6-10 March.
3. Whelan, M.J., **Gangone, M.V.**, Janoyan, K.D. (2011). "Effect of Sensor Placement on Operational Modal Analysis of Steel Girder Bridges," *SPIE Smart Structures Symposium*, San Diego, CA, 6-10 March.
4. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2010). "Damage Detection of Highway Bridges Using Wireless Strain and Acceleration Measurements," *NDE/NDT for Highways and Bridges: Structural Materials Technology (SMT)*, New York, NY 16-20 August.
5. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. and Qiu, T. (2010). "High Rate Wireless Strain Monitoring of an FRP Bridge Deck Replacement Superstructure," *NDE/NDT for Highways and Bridges: Structural Materials Technology (SMT)*, New York, NY August 16-20.
6. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. and Qiu, T. (2010). "Wireless Sensor Performance Monitoring of an Innovative Bridge Design in New York State," *International Association for Bridge Management and Safety (IABMAS)*, Philadelphia, PA, 11-15 July.
7. **Gangone, M.V.**, Whelan, M.J., and Janoyan, K.D. (2009). "Case Studies of Wireless Sensor Monitoring for Structural Identification and Evaluation of Bridge Superstructures," *International Workshop on Structural Health Monitoring*, Stanford, CA, 9-11 September.
8. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2009). "Wireless Monitoring of a Multi-Span Bridge Superstructure for Structural Evaluation," *4th International Conference on Structural Health Monitoring on Intelligent Infrastructure (SHMII-4)*, Zurich, Switzerland, 22-24 July.

9. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D. (2009). “Wireless Sensing Systems for Bridge Condition Assessment and Health Monitoring,” *SPIE Smart Structures Symposium*, San Diego, CA, 8-12 March.
10. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Jha. R. (2008). “Field Deployment of a Dense Wireless Sensor Network for Condition Assessment of a Multi-Span Bridge,” *SPIE Smart Structures Symposium*, San Diego, CA, 13-17 March.
11. Whelan, M.J., **Gangone, M.V.**, and Janoyan, K.D., Jha, R. (2008). “Wireless Vibration Monitoring for Damage Detection of Highway Bridges,” *SPIE Smart Structures Symposium*, San Diego, CA, 13-17 March.
12. Whelan, M.J., **Gangone, M.V.**, and Janoyan, K.D. (2007). “Integrated Smart Wireless Sensors for Bridge Structural Health and Homeland Security Monitoring,” *3rd International Conference on Intelligent Infrastructure*, Vancouver, British Columbia, Canada, 14-16 November.
13. Whelan, M.J., **Gangone, M.V.**, Janoyan, K.D. Cross, K., and Jha, R. (2007). “Reliable High-Rate Bridge Monitoring using Dense Wireless Sensor Arrays,” *International Workshop on Structural Health Monitoring*, Stanford, CA, 11-13 September.
14. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Cross, K., and Jha, R. (2007). “Performance Monitoring of a Bridge Superstructure Using Dense Wireless Sensor Networks,” *International Workshop on Structural Health Monitoring*, Stanford, CA, 11-13 September.
15. Cross, K., Jha, R., Whelan, M.J., and Janoyan, K.D., **Gangone, M.V.** (2007). “Bridge Health Monitoring Using Non-Linear Approaches: Experimental Validation,” *International Workshop on Structural Health Monitoring*, Stanford, CA, 11-13 September.
16. Whelan, M.J., Fuchs, M.P., **Gangone, M.V.**, and Janoyan, K.D. (2007). “Development of a Wireless Bridge Monitoring System for Condition Assessment using Hybrid Techniques,” *SPIE Smart Structures Symposium*, San Diego, CA, 18-22 March.
17. **Gangone, M.V.**, Whelan, M.J., Fuchs, M.P. and Janoyan, K.D. (2007). “Performance Monitoring of a Single-Span Integral-Abutment Bridge using a Dense Wireless Sensor Network,” *SPIE Smart Structures Symposium*, San Diego, CA, 18-22 March.
18. **Gangone, M.V.**, Kroening, R.A., Minnetyan, L., Janoyan, K.D., Grimmke, W.F. (2005). “Evaluation of FRP Rebar Reinforced Concrete Bridge Deck Superstructures,” *American Society for Non-Destructive Testing (ASNT)*, Columbus, OH, 12 October.

TECHNICAL REPORTS

1. **Gangone, M.V.**, Whelan, M.J., Janoyan, K.D., Minnetyan, L. (2010). “Performance Monitoring of the Vibration and Strain Response of the CR55 Bridge Crossing Dear River In North Lawrence, NY,” Final Report to St. Lawrence County Department of Highways.
2. **Gangone, M.V.**, Minnetyan, L., Janoyan, K.D., Batson, G.B. (2010). “Design and Monitoring of an Carbon Fiber Reinforced Polymer (CFRP) Reinforced Concrete Bridge Deck Superstructure Crossing Little White Creek in White Creek NY,” Final Report to Washington County Department of Public Works.
3. Whelan, M.J., Janoyan, K.D., **Gangone, M.V.** (2009). “Nine Wells Rail Bridge on Addenbrooke’s Access Road: Vibration Monitoring, Operational Modal Analysis, and Structural Identification,” Final Report to Atkins Ltd.
4. Janoyan, K.D., Whelan, M.J., **Gangone, M.V.** (2008). “Wireless Structural Health Monitoring Applications for Bridges,” Final Report to General Electric and Lockheed Martin.

PRESENTATIONS

1. * “Improved Bridge Performance through Innovative Design and Condition Assessment,” *Department of Civil and Environmental Engineering Seminar*, University of Texas at Tyler, Tyler, TX, March 2012, (invited).
2. * “Improved Bridge Performance through Innovative Design and Condition Assessment,” *Department of Civil and Environmental Engineering Seminar*, University of Texas at El Paso (UTEP), El Paso, TX, April 2011, (invited).
3. * “Condition Assessment of a Damaged Bridge Superstructure Using Diagnostic Performance Indicators,” *SPIE Smart Structures Symposium*, San Diego, CA, 6-10 March.
4. ** “Wireless Sensor Solution for In-Service Bridge Monitoring,” *Center for Advanced Materials and Proccession (CAMP) Fall 2009 & 2010 Symposium*, Clarkson University, Potsdam, NY, October 2009.
5. * “Integrated Wireless Sensor Network for Bridge Health Monitoring,” *Department of Civil and Environmental Engineering Seminar*, Clarkson University Potsdam, NY, 9 November 2007, (invited).
6. * “Development and Deployment of a Wireless Bridge Structural Health Monitoring System,” *ASCE Clarkson University Student Chapter and Syracuse Section annual dinner*, Clarkson University, Potsdam, NY, 21 April 2007, (invited).
7. ** “Performance Monitoring of a Bridge Superstructure Using Dense Wireless Sensor Networks,” *International Workshop on Structural Health Monitoring*, Stanford, CA, 11-13 September 2007.
8. * “Performance monitoring of a short-span integral-abutment bridge using wireless sensor technology,” *SPIE Smart Structures Symposium*, San Diego, CA, 18-22 March 2007.

9. * “Evaluation of FRP Rebar Reinforced Concrete Bridge Deck Superstructures,” *American Society for Non-Destructive Testing (ASNT)*, Columbus, OH, 12 October 2005.

* *Oral Presentation* ** *Poster Presentation*

REVIEWER

1. Structure and Infrastructure Engineering: Maintenance, Management, Life-cycle Design and Performance.
2. Computer-Aided Civil and Infrastructure Engineering (CACIE) Journal, 2010.
3. Smart Structures and Systems: Special Issue on Wireless Sensor Advances and Applications for Civil Infrastructure, 2010.
4. Geotechnical & Geological Engineering. Special Edition on: Monitoring and Assessment of Physical Structures, 2009.
5. American Concrete Institute (ACI) Special Publication on Health Monitoring Systems and Sensors for Assessing Concrete, 2008.

UNDERGRADUATE ADVISEMENT

1. Allen Berber, “Geothermal Energy Piles,” 2008-2009.
2. Sarah Marin, “Benchmark Bridge for Structural Health Monitoring,” and “Engineering Education: An Analysis of Current Processes in Introduction to Civil Engineering, CE212, at Clarkson University,” 2008-2009.
3. Francis O’Dayamba, “Benchmark Bridge for Structural Health Monitoring,” and “Embedment Depths of Wind Turbine Towers and its Effects on Natural Frequency,” 2008-2009
4. Matthew LaPlante, “Field Testing of Bridges,” 2008.
5. Michael Hayes, “Geotechnical Engineering Laboratory,” 2006.
6. Rebecca Kroening, “Design and Evaluation of Roadway Wildlife Barriers” and “Evaluation and Monitoring of FRP Rebar Reinforced Concrete Bridge Deck Superstructure,” 2005-2006.

MEDIA RELATIONS

1. New York Times, Feature Article, “Health Care for Bridges: A Search for Diagnostic Tools,” November 1, 2007.
2. Low Bidder Magazine, publication of the NYS Associated General Contractors (AGC) of America, “Wireless Bridge Monitoring,” January/February 2008.
3. News 10 Now, TV Broadcast and News Article, “Bridge monitoring system tested in Colton,” October 2007.
4. WWNY 7, TV Broadcast and News Article, “Detecting Bridge Weakness”, October 2007.
5. News 10 Now, TV Broadcast and News Article, “Clarkson University studies bridge safety,” August 2007.