

# VIET QUOC LE

ARUP Graduate Advanced Technology & Research Engineer

[REDACTED], vqle21@gmail.com, <https://vqle21.github.io>

## Education

**Doctor of Philosophy in Civil (Structural) Engineering** - Northeastern University 2016-2020

- Dissertation: *A Performance-based Wind Engineering Framework for Vertical Structures Subjected to Nonstationary Wind Loads*
- Successfully defended dissertation on April 09, 2020

**Master of Science in Civil (Structural) Engineering** - University of Massachusetts Lowell 2015-2016

- Thesis: *Detection and Quantification of Damage from ASR Gels Using Multiphysical Nondestructive Evaluation*

**Bachelor of Science in Civil & Environmental Engineering** - University of Massachusetts Lowell 2011-2015

- Summa Cum Laude, GPA: 3.98/4.00

## Professional and Research Experience

**Structural Engineering Graduate Research Assistant** - Northeastern University, Boston, MA 2016/09 - 2020/05

- Developed a performance-based engineering framework for the risk and life-cycle cost assessment of vertical structures subjected to wind loads from thunderstorm downbursts and tornadoes
- Conducted wind tunnel tests to simulate and analyze non-stationary wind outflows and their effects on a building model
- Applying data science techniques to approximate structural responses and fragilities

**Structural Engineering Graduate Teaching Assistant** - Northeastern University, Boston, MA 2017/09-2020/05

- Provided assistance for Steel Design and for Materials and Measurements courses
- Graded homework and lab reports, led lectures and labs, and held office hours for students

**Research Intern** - GCP Applied Technologies, Cambridge, MA 2016/06-2016/08

- Performed image analysis and data clustering techniques for the improvement of quality control for concrete mixes

**Structural Engineering Research Assistant** - University of Massachusetts Lowell, Lowell, MA 2013/05-2016/05

- Involved in the multiphysical nondestructive evaluation of cementitious composites using microwave imaging radar, ultrasonic testing, dielectric measurements with a contact probe, and an unmanned aerial vehicle

**Geoenvironmental Engineering Research Assistant** - University of Massachusetts Lowell, Lowell, MA 2012/05-2012/09

- Worked in a multi-disciplinary research group for novel technology in geoenvironmental site characterization

## Technical Skills

### Proficient/Working Knowledge

- MATLAB, Microsoft Office, Python, LaTeX

### Basic Knowledge

- ANSYS Fluent, OpenFOAM, AutoCAD, C++, LabView

## Select Publications

### Peer-reviewed Journal Papers

- Le, V.; Caracoglia, L. (2020). "Performance-based wind engineering framework to analyze vertical structures subjected to nonstationary downburst and tornado loads", *Structural Safety*. (Under review).
- Le, V.; Caracoglia, L. (2020). "Experimental investigation of non-stationary wind loading effects generated with a multi-blade flow device", *Journal of Fluids and Structures*. (Under review).
- Le, V.; Caracoglia, L. (2020). "A neural network surrogate model for the performance assessment of a vertical structure subjected to non-stationary, tornadic wind loads", *Computers & Structures*. 231: 106208.
- Le, V.; Caracoglia, L. (2020). "Life-cycle cost analysis of a point-like structure subjected to tornadic wind loads", *ASCE Journal of Structural Engineering*. 146 (2): 04019194.

## Memberships and Certifications

**Fundamentals of Engineering Exam** - Passed 2015/10

**American Society of Civil Engineers (ASCE)** - Associate Member (A.M.) 2020/05-Present

**American Association for Wind Engineering (AAWE)** - Student Member 2020/05-Present

**Associazione Nazionale per l'Ingegneria del Vento (ANIV-G)** - Young Professional Member 2020/05-Present

## Awards and Honors

### Northeastern University

- Recipient of PhD Network Dissertation Research Grant 2019/05
- College of Engineering PhD Bridge Funding Fellowship 2019/03
- College of Engineering Dean's Fellowship 2016/05

### American Concrete Institute

- Kumar Mehta Scholarship 2016/05

### United States Department of Energy

- Integrated University Program Fellowship 2015/05

### American Society of Nondestructive Testing

- Engineering Undergraduate Award 2014/05

### University of Massachusetts Lowell

- Dean's Gold Medal - Highest Achievement (Graduate College of Engineering) 2016/05
- Summa Cum Laude 2015/05
- Chancellor's Medal for Distinguished Academic Achievement in Engineering 2015/05
- Dean's List 2011-2015
- William Haskell Award for Outstanding Junior 2014/05
- Herman J. Shea Award for Outstanding Sophomore 2013/05

## Community Outreach Activities

### Northeastern University Graduate Structural Engineering Association - President 2018/09-2019/09

- Recognized by the ASCE Structural Engineering Institute (SEI) as 2020 Graduate Student Chapter of the Year
- Organized student and professional seminars for graduate structural engineering students
- Arranged "Documentary Nights" centered on the role and ethical responsibilities of civil engineers in society
- Attended the 2018 SEI Local Leaders Conference (LLC) hosted by ASCE

### Northeastern University - Tongji University Workshop on Wind Engineering - Co-chair 2019/05

- Co-led a student organized workshop to discuss the latest developments in wind engineering research from Northeastern University and Tongji University
- Procured funding through the Northeastern University PhD Network Dissertation Research Grant

### Tau Beta Pi Engineering Honors Society (UMass Lowell - MA Theta) - President 2014/03-2015/03

- Organized "Academic Advising Sessions" for upperclassmen to advise underclassmen peers on course planning
- Organized professional seminars for undergraduate engineering students

### UMass Lowell Vietnamese Student Association (UMass Lowell VSA) - President/Vice President 2013/05-2015/05

- Organized gatherings with undergraduate students to celebrate Vietnamese culture

### Red Lotus Lion Dance Troupe - Co-captain 2013/11-2017/05

- Performed traditional "lion dance" for holidays throughout the lunar calendar and special celebratory events

### American Society of Civil Engineers (UMass Lowell Student Chapter) - Social Chair 2012/09-2013/01

- Assisted with advertisement of the chapter's activities

### Chi Epsilon - The Civil Engineering Honor Society (UMass Lowell Chapter) - Student Member 2013/01-2015/05

## Languages

**English** - Native/Proficient

**Vietnamese** - Intermediate

**Spanish** Elementary

## Publications and Presentations

### Peer-reviewed Journal Papers

#### First Author

- J1. Le, V.; Caracoglia, L. (2020). "Monte-Carlo simulations of non-synoptic velocity profiles using copulas", *Journal of Wind Engineering and Industrial Aerodynamics*. (Under review).
- J2. Le, V.; Caracoglia, L. (2020). "Performance-based wind engineering framework to analyze vertical structures subjected to nonstationary downburst and tornado loads", *Structural Safety*. (Under review).
- J3. Le, V.; Caracoglia, L. (2020). "Experimental investigation of non-stationary wind loading effects generated with a multi-blade flow device", *Journal of Fluids and Structures*. 96: 103049. DOI:10.1016/j.jfluidstructs.2020.103049
- J4. Le, V.; Caracoglia, L. (2020). "A neural network surrogate model for the performance assessment of a vertical structure subjected to non-stationary, tornadic wind loads", *Computers & Structures*. 231: 106208. DOI:10.1016/j.compstruct.2020.106208
- J5. Le, V.; Caracoglia, L. (2020). "Life-cycle cost analysis of a point-like structure subjected to tornadic wind loads", *ASCE Journal of Structural Engineering*. 146 (2): 04019194. DOI:10.1061/(ASCE)ST.1943-541X.0002480
- J6. Le, V.; Caracoglia, L. (2019). "Generation and characterization of a non-stationary flow field in a small-scale wind tunnel using a multi-blade flow device", *Journal of Wind Engineering and Industrial Aerodynamics*. 186: 1-16. DOI:10.1016/j.jweia.2018.12.017
- J7. Le, V.; Caracoglia, L. (2018). "Computationally efficient stochastic approach for the fragility analysis of vertical structures subjected to thunderstorm downburst winds", *Engineering Structures*. 165: 152-169. DOI:10.1016/j.engstruct.2018.03.007

#### Co-Author

- J8. Yu, T.; Twumasi, J.O.; Le, V.; Tang, Q.; D'Amico, N. (2017). "Surface and subsurface remote sensing of concrete structures using synthetic aperture radar imaging", *ASCE Journal of Structural Engineering*. 143 (10): 04017143. DOI:10.1061/(ASCE)ST.1943-541X.0001730

### Conference Papers and Presentations

#### First Author

- C1. Le, V.; Caracoglia, L. (2019). "Performance-based design of vertical structures impacted by thunderstorm downburst and tornado wind loads by wavelet-Galerkin approach", Presented at: *1<sup>st</sup> Northeastern University - Tongji University Workshop on Wind Engineering (NU-TJU WWE1)*, May 23, 2019, Northeastern University, Boston, MA, USA.
- C2. Le, V.; Caracoglia, L. (2018). "Performance-based assessment of tall buildings subjected to thunderstorm downburst loads using the Wavelet-Galerkin approach", Presented at: *Engineering Mechanics Institute (EMI) Conference 2018*, Massachusetts Institute of Technology, Cambridge, MA, USA.
- C3. Le, V.; Caracoglia, L. (2017). "A preliminary examination of structural fragility for a vertical cantilever structure subjected to thunderstorm downburst loading", Full paper presented and found in: *Proceedings of the 13<sup>th</sup> Americas Conference on Wind Engineering (ACWE13)*, University of Florida, Gainesville, Florida, USA.
- C4. Le, V.; Yu, T.; Twumasi, J.O.; Tang, Q. (2016). "Sizing and ranging criteria for SAR images of steel and wood specimens", Full paper presented and found in: *2016 SPIE Proceedings Vol. 9804: Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure*, Las Vegas, Nevada, USA.
- C5. Le, V.; Yu, T. (2015). "Mass and stiffness estimation using mobile devices for structural health monitoring", Full paper presented and found in: *2015 SPIE Proceedings Vol. 9437: Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure*, San Diego, California, USA.

#### Co-Author

- C6. Twumasi, J.O.; Le, V.; Tang, Q.; Yu, T. (2016). "Quantitative sensing of corroded steel rebar embedded in cement mortar specimens using ultrasonic testing", Full paper presented and found in: *2016 SPIE Proceedings Vol. 9804: Nondestructive Characterization and Monitoring of Advanced Materials, Aerospace, and Civil Infrastructure*, Las Vegas, Nevada, USA.
- C7. Qin, Y.; Twumasi, J.O.; Le, V.; Ren, Y.-J.; Lai, C.P.; Yu, T. (2016). "Roadside IED detection using subsurface imaging radar and rotary UAV", Full paper presented and found in: *2016 SPIE Proceedings Vol. 9823: Detection and Sensing of Mines, Explosive Objects, and Obscured Targets XXI*, Baltimore, Maryland, USA.

### Software Programs

- S1. Caracoglia, L.; Le, V., (2020), "A MATLAB-based GUI for Performance-based Tornado Engineering (PBTE) of a Monopole, Vertical Structure with Artificial Neural Networks (ANN)", *DesignSafe-CI*, MATLAB Application. DOI:10.17603/ds2-g7fe-1k09
- S2. Caracoglia, L.; Le, V., (2019), "Simulation of the dynamics of a monopole structure subjected to non-stationary, stochastic downburst wind loads using the Wavelet-Galerkin approach", *DesignSafe-CI*, MATLAB Application. DOI:10.17603/ds2-a8nq-g348

### Thesis/Dissertation

- TD1. Le, V., *Detecting and quantification of damage from ASR gels using multiphysical nondestructive evaluation*, M.S. Thesis, University of Massachusetts Lowell, May 2016 (155 pages). [Link](#).
- TD2. Le, V., *A Performance-based Wind Engineering Framework for Vertical Structures Subjected to Nonstationary Wind Loads*, Ph.D. Dissertation, Northeastern University, May 2020 (456 pages).

## Poster Presentations

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- P1. Le, V.; Caracoglia, L. (2020). "Framework to extend performance-based engineering for the treatment of wind loads from thunderstorm downbursts and tornadoes", Poster presented at: *2020 Research, Innovation and Scholarship Expo (RISE: 2020)*, April 09, 2020, Northeastern University, Boston, MA, USA. [Link to poster.](#)
- P2. Le, V.; Caracoglia, L. (2020). "Performance-based tornado engineering (PBTE) of a vertical structure via Artificial Neural Network (ANN) surrogate modeling", Poster presented at: *2020 MathWorks SMART Laboratory Northeastern University Collaboration Day Event*, February 21, 2020, Northeastern University, Boston, MA, USA.
- P3. Le, V.; Caracoglia, L. (2020). "Performance-based evaluation of structures impacted by winds from thunderstorm systems via surrogate modeling", Poster presented at: *2020 Northeastern University College of Engineering PhD Research Expo*, February 20, 2020, Northeastern University, Boston, MA, USA.
- P4. Le, V.; Caracoglia, L. (2019). "Performance-based framework for the evaluation of non-stationary wind loads on vertical structures", Poster presented at: *Northeastern University 9<sup>th</sup> Annual Civil & Environmental Engineering Industry Leadership Night*, October 29, 2019, Northeastern University, Boston, MA, USA.
- P5. Le, V.; Caracoglia, L. (2019). "Analytical methodology for the performance-based assessment of vertical structures impacted by thunderstorm downburst and tornado wind loads", Poster presented at: *2019 Research, Innovation and Scholarship Expo (RISE: 2019)*, April 4, 2019, Northeastern University, Boston, MA, USA. [Link to poster.](#)
- P6. Le, V.; Caracoglia, L. (2019). "Machine learning algorithms for performance-based tornado engineering in the MATLAB<sup>®</sup> computing environment", Poster presented at: *2019 MathWorks SMART Laboratory Northeastern University Collaboration Day Event*, February 26, 2019, Northeastern University, Boston, MA, USA.
- P7. Le, V.; Caracoglia, L. (2019). "Performance-based structural design against thunderstorm and tornadic loads: Recent numerical and experimental developments", Poster presented at: *2019 Northeastern University College of Engineering PhD Research Expo*, February 21, 2019, Northeastern University, Boston, MA, USA.
- P8. Le, V.; Caracoglia, L. (2018). "Performance-based engineering framework for vertical structures subjected to non-stationary wind loads", Poster presented at: *Northeastern University 8<sup>th</sup> Annual Civil & Environmental Engineering Industry Leadership Night*, November 28, 2018, Northeastern University, Boston, MA, USA.
- P9. Le, V.; Caracoglia, L. (2018). "Investigations on the structural performance of building structures subjected to non-stationary thunderstorm wind loads by wavelet-Galerkin numerical methods", Poster presented at: *2018 Research, Innovation and Scholarship Expo (RISE: 2018)*, April 6, 2018, Northeastern University, Boston, MA, USA. [Link to poster.](#)
- P10. Le, V.; Caracoglia, L. (2018). "A MATLAB<sup>®</sup>-based numerical algorithm for stochastic simulation of structural load, response and damage (MATLAB<sup>®</sup> SLRD) induced by non-stationary thunderstorm downbursts. Poster presented at: *2018 MathWorks SMART Laboratory Northeastern University Collaboration Day Event*, Mar. 12, 2018, Northeastern University, Boston, MA, USA.