Viet Quoc Le, PhD

Engineer, Arup, Advanced Technology + Research

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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*

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

Professional and Research Experience

Engineer - Arup, New York, NY 2020/09 - Present

· Specialize in wind engineering assessment of wind hazards, loads, and the resilience of the built environment
· Apply beyond code and leading-edge analytical methods to evaluate wind climate phenomena and their effects
· Employ computational fluid dynamics (CFD) simulation tools for wind comfort analysis, dispersion modeling, and aerodynamic and aeroelastic modeling of wind loads and structures

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

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

Select Publications

Peer-reviewed Journal Papers and Technical Notes

· Le, V.; Caracoglia, L. (2021). "Life-cycle cost assessment of building and tower structures under nonstationary winds: Downburst vs. tornado loads", *Engineering Structures*. 243: 112515. Link.
· 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. Link.
· 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. Link.

Technical Experience and Skills

Analysis

· CFD, Wind engineering, Microclimate assessment, Probabilistic risk assessment, Signal processing

Software

· Python, OpenFOAM, Rhinoceros 3D, Grasshopper, MATLAB, Microsoft Office, LaTeX

Memberships and Certifications

Fundamentals of Engineering Exam - Passed 2015/10
American Society of Civil Engineers (ASCE) - Associate Member (A.M.) Present
American Association for Wind Engineering (AAWE) - Member 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 for 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 - Elementary/Intermediate
Spanish - Elementary

Publications and Presentations

Peer-reviewed Journal Papers

First Author

J1. Le, V.; Caracoglia, L. (2022). "Practical Approach to Digitally Simulate Nonsynoptic Wind Velocity Profiles and Its Implications on the Response of Monopole Towers", *ASCE Journal of Structural Engineering*. 148 (1): 06021007. DOI:10.1061/(ASCE)ST.1943-541X.0003228

J2. Le, V.; Caracoglia, L. (2021). "Life-cycle cost assessment of building and tower structures under nonstationary winds: Downburst vs. tornado loads", *Engineering Structures*. 243: 112515. DOI:10.1016/j.engstruct.2021.112515

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.compstruc.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. (2020). "A Performance-based Wind Engineering Framework Tailored to the Analysis of Vertical Structures Impacted by Downburst and Tornado Wind Loads", Presented (online) for: *One-Day On-Line Event IN-VENTO 2020*, Sept. 07, 2020, Politecnico di Milano – Polo di Lecco, Lecco, Italy.

C2. 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: *1st Northeastern University - Tongji University Workshop on Wind Engineering (NU-TJU WWE1)*, May 23, 2019, Northeastern University, Boston, MA, USA.

C3. 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.

C4. 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 13th Americas Conference on Wind Engineering (ACWE13)*, University of Florida, Gainesville, Florida, USA.

C5. 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.

C6. 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

C7. Ramponi, R.; Le, V.; Haskell, J.; Brooks, A. (2021). "Impact of landscaping elements on pedestrian wind simulations using OpenFOAM", Full paper and presentation prepared: *17th International IBPSA Building Simulation Conference*, Bruges, Belgium.

C8. 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.

C9. 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., *A Performance-based Wind Engineering Framework for Vertical Structures Subjected to Nonstationary Wind Loads*, Ph.D. Dissertation, Advisor: Luca Caracoglia, Northeastern University, May 2020. Link.

TD2. Le, V., *Detection and quantification of damage from ASR gels using multiphysical nondestructive evaluation*, M.S. Thesis, Advisor: Tzuyang Yu, University of Massachusetts Lowell, May 2016. Link.

Poster Presentations

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 9th 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® 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 8th 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®-based numerical algorithm for stochastic simulation of structural load, response and damage (MATLAB® 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.