

Aly Mousaad Aly, Ph.D., P.E.

Associate Professor, Department of Civil and Environmental Engineering, Louisiana State University
Founder and Director, WISE Research Group (Windstorm Impact, Science, and Engineering)

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PROFILE

Mechanical engineer by training and wind engineer by practice, working where fluid mechanics meets structural dynamics: how wind and other flows load buildings, bridges, solar and agrivoltaic systems, wind turbines, and airfoils, and how to predict and control the response. Founded and directs the WISE Research Group at LSU and established the LSU WISE open-jet facility for large-scale testing with complete atmospheric boundary-layer turbulence. Editor of *Wind and Structures*, Associate Editor of an ASCE journal, and past Chair of the ASCE Engineering Mechanics Institute's Fluid Dynamics Committee.

Author of 75 peer-reviewed journal articles (16 sole-authored), 3 edited books, and 6 book chapters, and co-inventor on a U.S. patent; h-index over 30 with more than 3,200 citations (Google Scholar, October 2026). Listed in the Stanford University/Elsevier "World's Top 2% Scientists" ranking (career-long impact, 2021–2026; single-year impact, 2020–2026). Co-recipient of the 2026 ASCE State-of-the-Art of Civil Engineering Award. Has guided 7 Ph.D. and 19 M.S. students to completion.

Research areas: large-scale open-jet wind testing; bluff-body aerodynamics and wind loads; computational fluid dynamics (LES, RANS) accelerated by machine learning; structural dynamics, vibration control, and smart (semi-active) structures; aeroelasticity and fluid–structure interaction; wind-resilient solar, agrivoltaic, and wind-energy systems; transportation infrastructure.

APPOINTMENTS

- **2019–** Associate Professor, Civil and Environmental Engineering, Louisiana State University; Founder and Director, WISE Research Group; oversees the LSU WISE open-jet testing facility.
- **2023** Visiting Faculty, Oregon State University (winter and spring).
- **2022, 23** Summer Faculty Fellow, U.S. Air Force Research Laboratory (AFOSR Summer Faculty Fellowship Program).
- **2019–20** Graduate Programs Advisor, Civil and Environmental Engineering, Louisiana State University.
- **2013–19** Assistant Professor, Civil and Environmental Engineering, Louisiana State University.
- **2012–13** Research Fellow, Boundary Layer Wind Tunnel Laboratory, Western University, Canada.
- **2010–12** Assistant Professor, Mechanical Engineering, Alexandria University, Egypt.
- **2009–10** Postdoctoral Research Associate, International Hurricane Research Center and Civil and Environmental Engineering, Florida International University.

EDUCATION AND LICENSURE

- **2009** Ph.D., Mechanical Engineering, Politecnico di Milano, Italy. Visiting Ph.D. student, Civil Engineering, University of Connecticut, 2007.
- **2005** M.Sc., Mechanical Engineering, Alexandria University, Egypt.
- **2001** B.Sc., Mechanical Engineering (with honors), Alexandria University, Egypt.
- **2021** Licensed Professional Engineer (P.E.), State of Louisiana.

HONORS AND RECOGNITION

- **2026** ASCE State-of-the-Art of Civil Engineering Award (co-recipient), American Society of Civil Engineers, for the ASCE/SEI book *Effects of Climate Change on Life-Cycle Performance of Structures and Infrastructure Systems*.
- **2020–26** Stanford University/Elsevier “World’s Top 2% Scientists” list: career-long impact 2021–2026 and single-year impact 2020–2026; in the 2026 update, ranked 598 of 67,736 Civil Engineering researchers for career-long impact (top 1%) and 310 of 67,736 for single-year impact (top 0.5%).
- **2024** Distinguished Service Award, ASCE Engineering Mechanics Institute, as Chair of the Fluid Dynamics Committee.
- **2023** Advancing Structural Steel Education Award, American Institute of Steel Construction.
- **2018** Research Achievement Award, Department of Civil and Environmental Engineering, Louisiana State University.
- **2017** Rising Faculty Research Award, LSU Alumni Association.
- **2017** Outstanding Civil Engineering Educator Award, ASCE Baton Rouge Branch.

LEADERSHIP, EDITORIAL, AND PROFESSIONAL ROLES

- Editor, *Wind and Structures* (Techno-Press), 2020–present.
- Associate Editor, *Journal of Structural Design and Construction Practice*, ASCE, 2021–present.
- Guest Editor, *Communications Engineering* (Nature Portfolio) collection “Engineering Solutions in Wind Energy Systems: Design, Efficiency, and Sustainability,” 2025–2026.
- Review Editor, Wind Engineering and Science, *Frontiers in Built Environment*, 2016–present.
- Chair, Fluid Dynamics Committee, ASCE Engineering Mechanics Institute, 2022–2024 (Vice Chair 2020–2022; Secretary 2018–2020; member since 2016).
- Expert Peer Review Committee member, Council on Vertical Urbanism (formerly the Council on Tall Buildings and Urban Habitat), 2016–present.
- Organizer and lead of a seven-member Research Advisory Committee of industry, government, and university leaders guiding the group’s solar and wind-resilience research, first convened March 2024.
- Elected member, LSU Faculty Senate, 2017–2020 and 2025–2028; LSU Rising Leaders Program, 2025–2026.
- Proposal reviewer for the National Science Foundation (2018, 2020, 2022), the U.S. Department of Energy (2023), the Natural Sciences and Engineering Research Council of Canada, and the Czech Science Foundation (2021); reviewer for 27 international journals.

- Member, American Society of Civil Engineers and American Society of Mechanical Engineers.

FACILITY AND CAPABILITIES

- **LSU WISE open-jet facility:** designed and built with students in two phases, from a 15-fan prototype (2014) to the large-scale open jet; 4 m by 4 m test section reproducing complete atmospheric boundary-layer turbulence at Reynolds numbers up to 2.3×10^6 , depending on the test model, with integral length scales about ten times those of conventional small-scale testing.
- **Test range:** buildings, solar arrays and other renewable energy installations, wind turbines, bridges, and power transmission lines, including destructive testing at high wind speeds and wind-driven rain studies with water spray.
- **Instruments:** two Cobra probes for three-component velocity, five accelerometers, two load cells, and a 256-channel pressure measuring system; a shake table and four magneto-rheological dampers for structural-control experiments.
- **Computation:** large-eddy and Reynolds-averaged simulation in OpenFOAM and ANSYS, coupled with machine learning.

SIGNATURE RESULTS

- Open-jet surface pressures agree closely with full-scale field data and run 25–300% higher than small-scale tests, quantifying turbulence and geometric-scale effects (*Physics of Fluids*, 2024); on a 1:50 high-rise model, mean cladding pressures matched conventional wind tunnels while peak pressures ran higher (ASCE, 2022).
- Machine learning coupled with CFD predicts wind loads on solar panels up to 10,000 times faster than conventional CFD with accuracy preserved, and identified a -15° optimal stow angle for single-axis trackers in high winds (*Sustainable Cities and Society*, 2023).
- A deep-learning eddy-viscosity model trained on LES data improves RANS predictions in separated flows; the ML-based approach took about 6 minutes against about 182 hours for LES (*Journal of Applied Fluid Mechanics*, 2024).
- A tuned pendulum pounding mass damper reduced base shear by 55.7%, base moment by 41%, and inter-story drift by 40% in shake-table experiments, with greater robustness than conventional tuned mass dampers (*Soil Dynamics and Earthquake Engineering*, 2023).
- Rooftop PV arrays reduced total wind-induced forces on a low-rise gable roof by 45–63% in 1:7.5-scale open-jet tests (*Sustainable and Resilient Infrastructure*, 2023).
- A physics-based theory of semiactive control gains, built on a Lyapunov function, tunes smart dampers in multi-degree-of-freedom structures without iterative simulation (*ASCE Journal of Structural Engineering*, 2019).
- For pitching and plunging airfoils, higher motion frequencies increase thrust, thinner airfoils generate more thrust, and pivot locations near the leading edge are favorable (*AIAA Journal*, 2026).

SELECTED PUBLICATIONS (OF 75 JOURNAL ARTICLES)

Student co-authors advised by Dr. Aly are marked with an asterisk.

1. Aly, A.M., Medina, A. (2026). Unsteady aerodynamics of pitching and plunging airfoils: impact of motion-related parameters. *AIAA Journal*, 64(6), 3493–3506. doi:10.2514/1.J066135
2. Aly, A.M., Khaled*, M.F. (2024). Open-jet testing: investigating turbulence and geometric scale effects on surface pressures in the atmospheric boundary layer. *Physics of Fluids*, 36(12), 125141. doi:10.1063/5.0231093
3. Aly, A.M. (2024). Deep learning-based eddy viscosity modeling for improved RANS simulations of wind pressures on bluff bodies. *Journal of Applied Fluid Mechanics*, 17(12), 2514–2532. doi:10.47176/jafm.17.12.2770
4. Zahrawi*, A., Aly, A.M. (2024). A review of agrivoltaic systems: addressing challenges and enhancing sustainability. *Sustainability*, 16(18), 8271. doi:10.3390/su16188271
5. Aly, A.M., Clarke*, J. (2023). Wind design of solar panels for resilient and green communities: CFD with machine learning. *Sustainable Cities and Society*, 94, 104529. doi:10.1016/j.scs.2023.104529
6. Aly, A.M., Rone*, E. (2023). Wind loads on a low-rise gable roof with and without solar panels and comparison to design standards. *Sustainable and Resilient Infrastructure*, 8(6), 589–609. doi:10.1080/23789689.2023.2257506
7. Aly, A.M., Chapain*, S. (2023). Seismic response reduction using a tuned pendulum pounding mass damper: experimental verification of superior performance. *Soil Dynamics and Earthquake Engineering*, 173, 108044. doi:10.1016/j.soildyn.2023.108044
8. Aly, A.M., Khaled*, M.F., Clancy*, R. (2022). Large-scale open-jet testing: a new frontier in structural wind engineering. *Engineering Structures*, 266, 114567. doi:10.1016/j.engstruct.2022.114567
9. Xie*, F., Aly, A.M. (2020). Structural control and vibration issues in wind turbines: a review. *Engineering Structures*, 210, 110087. doi:10.1016/j.engstruct.2019.110087
10. Rezaee*, M., Aly, A.M. (2019). Proposed theory of semiactive gains for smart dampers in MDOF systems. *Journal of Structural Engineering*, ASCE, 145(12), 04019155. doi:10.1061/(ASCE)ST.1943-541X.0002453
11. Aly, A.M. (2016). On the evaluation of wind loads on solar panels: the scale issue. *Solar Energy*, 135, 423–434. doi:10.1016/j.solener.2016.06.018
12. Aly, A.M., Christenson, R.E. (2008). On the evaluation of the efficacy of a smart damper: a new equivalent energy-based probabilistic approach. *Smart Materials and Structures*, 17(4), 045008. doi:10.1088/0964-1726/17/4/045008

Patent. Voyiadjis, G.Z., Aly, A.M., Choi, J-W. Overheight Vehicles Impact Avoidance and Incident Detection System. U.S. Patent 12,049,233 B2, granted July 30, 2024; assignee: Board of Supervisors of Louisiana State University.

Edited books. *High Rise Buildings: An Interdisciplinary Examination of Structural, Environmental, and Technological Innovations* (IntechOpen, 2026); *Aerodynamics* (IntechOpen, 2021, with M. Gorji-Bandpy); *Wind Engineering for Natural Hazards: Modeling, Simulation, and Mitigation of Windstorm Impact on Critical Infrastructure* (ASCE, 2018, with E. Dragomirescu).

The complete list of journal articles, book chapters, proceedings, and talks is on the group website: [Publications](#).

MENTORING AND TEACHING

- Guided 7 Ph.D. and 19 M.S. students to completion and mentored 20 undergraduate researchers and 2 postdoctoral researchers; 38 journal articles co-authored with graduate students and 7 with students who began as undergraduates.
- Graduates hold positions at Texas Tech University (faculty), Geosyntec Consultants, Brown & Brown, Anchor QEA, HNTB, Fluor, Stantec, Tetra Tech, Forte & Tablada, Volkert, Nucor, BASF, and the U.S. Coast Guard.
- Taught 8 undergraduate and graduate courses across 39 semester offerings at LSU, from Dynamics and Vibrations and Structural Analysis to Steel Design and the senior capstone; created the graduate courses Wind Engineering (CE 7700) and Structural Control (CE 7701); led the certification of three courses as communication-intensive under LSU's Communication across the Curriculum program.
- Earlier teaching in mechanical engineering at Alexandria University (mechanical vibrations, mechanical design, stress analysis and machine design, mechanics of materials, drawing) and Automatic Control at Pharos University; guest lectures at Western University and an invited graduate course in wind engineering at Yangzhou University.

RESEARCH SUPPORT AND COLLABORATION

Research support as principal investigator or co-principal investigator from NASA, the National Science Foundation, the Federal Highway Administration through the Louisiana Transportation Research Center, the U.S. Air Force Research Laboratory, NOAA Sea Grant, the Louisiana Board of Regents, the Gulf of Mexico Alliance, and industry partners in energy, solar power, metal building systems, and electric utilities. Collaborations span LSU departments and institutes, Texas Tech University, Western University, Florida International University, the University of Connecticut, Politecnico di Milano, and industry and government partners on the group's Research Advisory Committee.

INVITED TALKS, OUTREACH, AND MEDIA

Keynote, International Conference on Advances in Wind and Structures (AWAS22, 2022); invited talks at the Seventh U.S.–Japan Workshop on Wind Engineering (Osaka, 2025), the NIST Disaster Resilience Symposium (2020), and the Texas Hurricane Center for Innovative Technology (2015); Distinguished Lecture, Florida International University (2012); invited lectures at Yangzhou University (2017) and Western University (2012–2013).

Research featured on WGNO *Good Morning New Orleans* (2024), in LSU Energy Innovation News (2024), in the *Business Report* (2021), and in *The Times-Picayune* (2017); LSU Science Café speaker (2021) and Teen Science Café speaker (2018); built a wind demonstration table for the Louisiana Art & Science Museum; mentored K–12 science-fair projects; faculty advisor to the Louisiana Hyperloop team and the LSU ASCE Student Chapter.

Short CV, updated October 2026. The full CV, including conference abstracts, posters, and technical reports, is available on request at aly@lsu.edu.