

Ali M. Hamed

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Associate Professor	2023 – Present
Assistant Professor	2017 – 2023
John D. MacArthur Assistant Professor	2020 – 2021
Department of Mechanical Engineering	
Union College	
Schenectady, NY 12308	

EDUCATION

University of Illinois, Urbana, IL

Ph.D., Mechanical Engineering

August 2017

M.Sc., Mechanical Engineering

May 2015

Washington and Lee University, Lexington, VA

B.S., Physics-Engineering

May 2013

B.A., Economics

May 2013

Summa cum laude

RESEARCH INTERESTS

Wall-bounded turbulence, environmental flows, renewable energy and wind farm flow dynamics, flow control and drag reduction, roughness-induced transition to turbulence, convective heat transfer, flow measurement techniques.

TEACHING

Union College

Fluid Mechanics 1 (undergraduate), Heat Transfer Analysis and Design (undergraduate), Thermodynamics 1 (undergraduate), Statics (undergraduate), Senior Writing Seminar (undergraduate).

University of Illinois (Teaching Assistant)

Experimental Fluid Mechanics (graduate), Statics (undergraduate).

ACADEMIC AND PROFESSIONAL ACTIVITIES

Reviewer

Journal of Fluid Mechanics, Journal of Geophysical Research – Earth Surface, Boundary-Layer Meteorology, Experimental Thermal and Fluid Science, Physics of Fluids, Scientific Reports, Energies, Nonlinear Dynamics, Journal of Energy Engineering, Fluids, Water, Remote Sensing, Applied Sciences, Entropy, Journal of Solar Energy Engineering

Session Chair

American Physical Society – Division of Fluid Dynamics, *Wind Turbine Interaction*, November, 2017.

Proposal Review Panelist

National Science Foundation (2018 and 2022)

Fluid Mechanics Technical Committee Member

American Society of Thermal and Fluids Engineers (since May 2023)

AWARDS AND HONORS

John D. MacArthur Assistant Professorship (Union College)	2020 – 2021
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Departmental Distinguished Graduate Student Award (University of Illinois)	2017
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Distinguished Student Seminar Award (American Physical Society - APS)	2016
List of Teachers Ranked as Excellent by Their Students (University of Illinois)	2014, 2015, 2016
Departmental Pre-doctoral Fellowship (University of Illinois)	2013
Williams Research Award (Washington and Lee University)	2013
Phi Beta Kappa (Washington and Lee University)	2012
Elizabeth B. Garrett Scholarship (Washington and Lee University)	2012
The Henry Ruffner Scholarship (Washington and Lee University)	2012

INTERNAL AND EXTERNAL GRANTS

External

- National Science Foundation, “ERI: Wake interactions past two roughness elements in close proximity,” 4/2023 – 3/2025, **\$198,202**, A. M. Hamed (sole PI).
- National Science Foundation, “MRI: Acquisition of a high-speed volumetric particle image velocimetry system for fluid mechanics research and research training in science, mathematics, and engineering,” 9/2019 – 8/2022, **\$384,725**, A. M. Hamed (PI) with Co-PIs: A. M. Anderson, B. A. Bruno, S. K. Rice, and J. Wang.

Internal

- Faculty Research Fund, “Exploratory research on turbulent boundary layer flow over roughness with heat transfer,” Spring 2023, **\$3,000**.
- Internal Education Foundation, “Development of a new lab on wind energy in MER 331: Fluid Mechanics,” Winter 2022, **\$4,300**, with S. Wehe.
- Faculty Research Fund, “Canopy turbulent flow perturbation due to local heterogeneities,” Spring 2021, **\$5,000**.
- Faculty Research Fund, “3D flow measurements of vortical structures downstream of a wall-mounted cylindrical roughness element,” Spring 2020, **\$3,000**.
- Faculty Research Fund, “Effects of roughness geometry on transition to turbulence,” Winter 2019, **\$3,000**.
- Internal Education Foundation, “Improvements to fluid mechanics and heat transfer labs,” Winter 2019, **\$2,875**.
- Faculty Research Fund, “Experimental study of roughness-induced transition to turbulence,” Fall 2017, **\$3,000**.
- Internal Education Foundation, “Improvements to flow measurements labs in fluid mechanics courses,” Fall 2017, **\$1,928**.

DEPARTMENT AND COLLEGE SERVICE

Department

- Search committee member for a tenure-track assistant professor position with B. Bruno (chair) and R. Cortez, academic year 2023/2024.
- Search committee member for two visiting assistant professor positions with R. Cortez (chair) and R. Wilk, Spring and Summer 2021.
- Search committee member for two visiting assistant professor positions with A. M. Anderson (chair) and R. Wilk, Fall 2018.

College

- Academic Affairs Council (AAC), representative from Division Four (Engineering and Computer Science), academic year 2022/2023 – 2024/2025.
- Faculty Review Board (FRB) Subcommittee on Teaching Criteria, representative from Division Four (Engineering and Computer Science), academic year 2023/2024.

- Templeton Institute Planning Committee, representative from the Department of Mechanical Engineering, 2021. The institute is enabled by a \$51 million gift to strengthen existing programs in engineering and computer science, establish new programs, and promote integration of engineering and computer science with the liberal arts.
- Faculty Review Board (FRB), junior faculty representative from Center Two (Sciences, Mathematics, Engineering, and Computer Science), academic year 2019/2020.
- Organizing Theme Committee with D. Zuckerman (chair), B. Cohen, S. Lullo, and R. Samet, Fall 2018 – Winter 2023.

PEER-REVIEWED JOURNAL PUBLICATIONS (* undergraduate mentees)

- [22] A. M. Hamed, C. T. O'Brien*, A. J. Hall*, R. M. Gallary*, J. J. DaRosa*, Q. L. Goddard*, and B. R. McAtee*, "Flow organization in the near wake of isolated and sheltered two-dimensional bar roughness elements," *Physical Review Fluids*, 8 (2), Art. No. 024602, 2023.
- [21] A. M. Hamed, C. E. Nye*, and A. J. Hall*, "Effects of localized blowing on the turbulent boundary layer over 2D roughness," *Experiments in Fluids*, 62, Art. No. 163, 2021.
- [20] A. M. Hamed, A. M. Peterlein*, and I. Speck*, "Characteristics of the turbulent flow within short canopy gaps," *Physical Review Fluids*, 5 (12), Art. No. 123801, 2020.
- [19] A. M. Hamed and A. M. Peterlein*, "Turbulence structure of boundary layers perturbed by isolated and tandem roughness elements," *Journal of Turbulence*, 21 (1), 17-33, 2020.
- [18] S. Dharmarathne, H. B. Evans, A. M. Hamed, B. Aksak, L. P. Chamorro, M. Tutkun, A. Doosttalab, and L. Castillo, "On the large- and small-scale motions in a separated, turbulent-boundary-layer flow," *Journal of Turbulence*, 20 (9), 563-576, 2019.
- [17] A. M. Hamed, A. M. Peterlein*, and L. V. Randle*, "Turbulent boundary layer perturbation by two wall-mounted cylindrical roughness elements arranged in tandem: Effects of spacing and height ratio," *Physics of Fluids*, 31 (6), Art. No. 065110, 2019.
- [16] A. M. Hamed and L.P. Chamorro, "Turbulent boundary layer around 2D permeable and impermeable obstacles," *Experiments in Fluids*, 59 (9), 1-9, 2018.
- [15] A. Doosttalab, S. Dharmarathne, H. B. Evans, A. M. Hamed, S. Gorumlu, B. Aksak, L. P. Chamorro, M. Tutkun, and L. Castillo, "Flow modulation by a mushroom-like coating around the separation region of a wind-turbine airfoil section," *Journal of Renewable and Sustainable Energy*, 10, Art. No. 043305, 2018.
- [14] H. B. Evans, A. M. Hamed, S. Gorumlu, A. Doosttalab, B. Aksak, L. P. Chamorro, and L. Castillo, "Engineered bio-inspired coating for passive flow control," *Proceedings of the National Academy of Sciences*, 115 (6), 1210-1214, 2018.
- [13] B. Liu, A. M. Hamed, and L. P. Chamorro, "On the Kelvin-Helmholtz and von Kármán vortices in the near wake of semicircular cylinders with flaps," *Journal of Turbulence*, 19 (1), 61-71, 2018.
- [12] A. M. Hamed, A. Pagan-Vazquez, D. Khovalyg, Z. Zhang*, and L. P. Chamorro, "Vortical structures in the near-wake of tabs with various geometries," *Journal of Fluid Mechanics*, 825, 167-188, 2017.
- [11] A. M. Hamed, L. Castillo, and L. P. Chamorro, "Turbulent boundary layer response to large-scale wavy topographies," *Physics of Fluids*, 29 (6), Art. No. 065113, 2017.
- [10] B. Liu, A. M. Hamed, Y. Jin, and L. P. Chamorro, "Influence of vortical structure impingement on the oscillation and rotation of flat plates," *Journal of Fluids and Structures*, 70, 417-427, 2017.

- [9] A. M. Hamed, J. Vega, B. Liu, and L. P. Chamorro, "Flow around a semicircular cylinder with passive flow control mechanisms," *Experiments in Fluids*, 58 (3), 1-12, 2017.
- [8] A. M. Hamed, M. J. Sadowski*, H. M. Nepf, and L. P. Chamorro, "Impact of height heterogeneity on canopy turbulence," *Journal of Fluid Mechanics*, 813, 1176-1196, 2017.
- [7] N. Tobin, A. M. Hamed, and L. P. Chamorro, "Fractional flow speedup from porous windbreaks for enhanced wind turbine power," *Boundary-Layer Meteorology*, 163 (2), 253-271, 2017.
- [6] A. M. Hamed, M. J. Sadowski*, Z. Zhang*, and L. P. Chamorro, "Transition to turbulence over 2D and 3D periodic large-scale roughnesses," *Journal of Fluid Mechanics*, 804, Art. No. R6, 2016.
- [5] A. M. Hamed, A. Kamdar*, L. Castillo, and L. P. Chamorro, "Turbulent boundary layer over 2D and 3D large-scale wavy walls," *Physics of Fluids*, 27 (10), Art. No. 106601, 2015.
- [4] A. M. Hamed, Y. Jin, and L. P. Chamorro, "On the transient dynamics of the wake and trajectory of free falling cones with various apex angles," *Experiments in Fluids*, 56 (11), 1-10, 2015.
- [3] N. Tobin, A. M. Hamed, and L. P. Chamorro, "An experimental study on the effect of winglets on the wake and performance of a model wind turbine," *Energies*, 8, 11955-11972, 2015.
- [2] J. P. Kuehner, A. M. Hamed, and J. D. Mitchell, "Experimental investigation of the free convection velocity boundary layer and plume formation region for a heated horizontal cylinder," *International Journal of Heat and Mass Transfer*, 82, 78-97, 2015.
- [1] J. P. Kuehner, J. R. Pflug, F. A. Tessier, A. M. Hamed, and F. J. Moiso Marin, "Velocity measurements in the free convection flow above a heated horizontal cylinder," *International Journal of Heat and Mass Transfer*, 55, 4711-4723, 2012.

INVITED TALKS

- Distinguished Student Seminar, American Physical Society (APS), March Meeting, 2017.
- Illinois Scholar Undergraduate Research Program, College of Engineering, University of Illinois, Urbana, IL, February 2017.
- Department of Mechanical Engineering, Union College, Schenectady, NY, February 2017.
- Department of Engineering, Harvey Mudd College, Claremont, CA, February 2017.
- Department of Mechanical and Aerospace Engineering, University of Central Florida, Orlando, FL, January 2017.

SELECTED CONFERENCE PRESENTATIONS (* undergraduate mentees)

- A. M. Hamed, C. E. Nye*, A. J. Hall*, and R. Gally*, "An experimental investigation of the turbulent boundary layer over 2D roughness with localized blowing," *American Physical Society – Division of Fluid Dynamics*, Phoenix, AZ (November, 2021).
- A. M. Hamed and A. M. Peterlein*, "Turbulent boundary layer perturbation by two wall-mounted cylinders arranged in tandem at various spacings and height ratios," *American Physical Society – Division of Fluid Dynamics*, Seattle, WA (November, 2019).
- A. M. Hamed, A. M. Peterlein*, and L. V. Randle*, "On the perturbation of a turbulent boundary layer by two wall-mounted roughness elements: Impact of spacing and height ratio," *4th Thermal and Fluids Engineering Conference*, Las Vegas, NV (April, 2019).
- H. B. Evans, A. M. Hamed, S. Gorumlu, A. Doosttab, B. Aksak, L. P. Chamorro, and L. Castillo, "Engineered bio-inspired coating for reduction of flow separation," *American Physical Society – Division of Fluid Dynamics*, Denver, CO (November, 2017).

- S. Dharmarathne, H. B. Evans, A. M. Hamed, B. Aksak, L. P. Chamorro, M. Tutkun, and L. Castillo, “Large-scale motions in a separated turbulent boundary layer,” *American Physical Society – Division of Fluid Dynamics*, Denver, CO (November, 2017).
- K. T. Christensen, N. Bristow, A. M. Hamed, T. Kim, G. Blois, and J. Best, “Quantifying aeolian flow-landform interactions using lab-scale experimental approaches,” *American Geophysical Union – Fall Meeting*, San Francisco, CA (December, 2016).
- A. M. Hamed, M. J. Sadowski*, and L. P. Chamorro, “Flow within and above heterogeneous and homogeneous canopies,” *American Physical Society – Division of Fluid Dynamics*, Portland, OR (November, 2016).
- N. Tobin, A. M. Hamed, and L. P. Chamorro, “Fractional flow speedup from porous windbreaks for enhanced wind turbine power,” *American Physical Society – Division of Fluid Dynamics*, Portland, OR (November, 2016).
- L. P. Chamorro, A. M. Hamed, and L. Castillo, “On the turbulent boundary layer over geophysical-like topographies,” *American Physical Society – Division of Fluid Dynamics*, Portland, OR (November, 2016).
- H. B. Evans, A. M. Hamed, S. Gorumlu, A. Doosttab, B. Aksak, L. P. Chamorro, and L. Castillo, “Effect of bio-inspired micro-pillars on the drag of a wing section,” *International Colloquium on Wind-Power Plants*, Richardson, TX (May, 2016).
- N. Tobin, A. M. Hamed, and L. P. Chamorro, “On the small- and large-scale control strategies for enhanced wind turbine power,” *International Colloquium on Wind-Power Plants*, Richardson, TX (May, 2016).
- N. Tobin, A. M. Hamed, and L. P. Chamorro, “Experimental study on the effect of winglets on the wake of a model wind turbine,” *American Physical Society – Division of Fluid Dynamics*, Boston, MA (November, 2015).
- A. M. Hamed, C. Z. Zamalloa, and L. P. Chamorro, “Flow field characterization over 2D and 3D periodic wavy walls using PIV in a refractive-index-matched channel,” *American Physical Society – Division of Fluid Dynamics*, San Francisco, CA (November, 2014).
- C. Z. Zamalloa, A. M. Hamed, and L. P. Chamorro, “Feature tracking for measurement of translational and angular displacements of solid objects in fluid flows with application to saltation,” *American Physical Society – Division of Fluid Dynamics*, San Francisco, CA (November, 2014).
- G. Blois, J. Barros, Z. Tang, T. Kim, A. M. Hamed, J. Best, and K. T. Christensen, “Experimental investigation of flow associated with interacting barchans dunes,” *17th U.S. National Congress on Theoretical and Applied Mechanics*, East Lansing, MI (June, 2014).
- M. D. Day, G. A. Kocurek, W. Anderson, A. M. Hamed, and K. T. Christensen, “Aeolian erosion of filled Martian craters,” *45th Lunar and Planetary Science Conference*, The Woodlands, TX (March, 2014).