

March 2022

Ahmad Vasel-Be-Hagh
Curriculum Vitae

Mechanical Engineering Department
Tennessee Technological University
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EDUCATION

Postdoc	Ocean Engineering	University of Delaware	US	2015-2017
Ph.D.	Mechanical Engineering	University of Windsor	Canada	2011-2015
M.Sc.	Mechanical Engineering	Ferdowsi University	Iran	2008-2011
B.Sc.,	Mechanical Engineering	Ferdowsi University	Iran	2004-2008

PROFESSIONAL APPOINTMENTS

2017 – Assistant Professor Mechanical Engineering Tennessee Tech University TN, US

GRANTS (Total: \$1,011,903.00)

2022-2027	PI	CAREER: CAS-Climate: Understanding Thermal Transport Processes in Atmospheric Boundary Layer with Utility-Scale Solar Photovoltaic Plants <i>National Science Foundation (NSF)</i> \$500,493
2022-2023	PI	Thermal treatment of nuclear plants' ice condensers using CO2 lasers <i>Tennessee Valley Authority (TVA)</i> \$250,000
2020-2021	PI	Development of a Laser-Based System for Maintenance of Ice Condensers <i>Tennessee Valley Authority (TVA)</i> \$185,000
2019 -2020	PI	Advanced wake loss modeling for large wind farms with variable wind speed and direction <i>US Department of Interior (via University of Delaware)</i> \$20,715
2019 – 2020	PI	Application of Artificial Intelligence for Air Pollution Monitoring and Remediation using Neural Network and Deep Learning, <i>Private Industry</i> \$10,619
2016	PI	Investigating the impact of wind turbines on surface fluxes using computational fluid dynamics <i>First State Marine Wind LLC</i> \$45,076

EDITORIAL RECORDS

Books

2021 *Utility-Scale Wind Turbines and Wind Farms*, The Institution of Engineering and Technology (IET), London, UK, pp. 340, DOI: <https://doi.org/10.1049/PBPO171E>

- 2020 *Environmental Management of Air, Water, Agriculture, and Energy, Food*, CRC Press, Boca Raton, USA, pp. 234, <https://doi.org/10.1201/9780429196607>
- 2019 *Advances in Sustainable Energy*, Springer, pp. VI, 193, DOI: <https://doi.org/10.1007/978-3-030-05636-0>

Special Issues

- 2021 *Tomorrow Energy & Resources*, Sustainable Energy Technologies and Assessments, Elsevier.
- 2018 - 2020 *Future and Sustainability*, International Journal of Sustainable Energy, Taylor and Francis.
- 2018-19 *Further Integration and Advancement of Sustainability*, Sustainable Energy Technologies and Assessments, Elsevier.
- 2017-18 *Natural Resources and Energy Usage*, Sustainable Energy Technologies and Assessments, Elsevier.

Proceedings

- 2022 *Mitigating Climate Change*, Springer International Publishing, pp. XII, 233, DOI: <https://doi.org/10.1007/978-3-030-92148-4>
- 2021 *Sustaining Tomorrow*, Springer International Publishing, pp. X, 226, DOI: <https://doi.org/10.1007/978-3-030-64715-5>
- 2020 *Complementary Resources for Tomorrow*, Springer International Publishing, ISBN: 978-3-030-38803-4, pp. VII, 250, DOI: <https://doi.org/10.1007/978-3-030-38804-1>
- 2019 *The Energy Mix for Sustaining Our Future: Selected Papers from Proceedings of Energy and Sustainability*, Springer International Publishing, pp. VI, 181, DOI: <https://doi.org/10.1007/978-3-030-00105-6>
- 2017 Proceedings of the International Conference of Numerical Analysis and Applied Mathematics (ICNAAM 2017), American Institute of Physics (AIP).

PUBLICATIONS

Chapters

- 2021 Hackler, M., Vasel-Be-Hagh, A., Ting, D. (2021). Chapter 1: “The Current Status of Wind Power,” In: “Utility-Scale Wind Turbines and Wind Farms,” Editors: Vasel-Be-Hagh, A., Ting, D., *The Institute of Engineering and Technology* (London, UK), 1-15.
- 2021 Unser, L., Vasel-Be-Hagh, A. (2021). Chapter 3: “Scaling Utility-Scale Wind Turbines,” In: “Utility-Scale Wind Turbines and Wind Farms,” Editors: Vasel-Be-Hagh, A., Ting, D., *The Institute of Engineering and Technology* (London, UK), 39-47.
- 2020 Unser, L., Vasel-Be-Hagh, A. (2020). Chapter 10: “A Preliminary Evaluation on the Performance of Diffuser-augmented Vertical Axis Wind Turbines,” In: “Complementary Resources for Tomorrow,” *Springer International Publishing* (Cham, Switzerland), 163-174.
- 2020 Long, C.S., Vasel-Be-Hagh, A. (2020). Chapter 6: “Storage-Integrated Energy Harvesters,” In: “Environmental Management of Air, Water, Agriculture, and Energy,” *Routledge* (Boca Raton, Florida), 119-140.
- 2018 Vasel-Be-Hagh, A. (2018). Chapter 3: “Optimization of Wind Farms for Communities,” In: “Wind and Solar Based Energy Systems for Communities,” *The Institution of Engineering and Technology* (London, UK), 28-61.

Peer-Reviewed Journal Articles

- 2022 Ma, Y., Archer, C.L., Vassel-Be-Hagh, A. (2022). “An Ensemble Wind Farm Parameterization for the WRF Model,” *Wind Energy* (accepted for publication)
- 2022 Ma, Y., Archer, C.L., Vassel-Be-Hagh, A. (2022). “The Jensen Wind Farm Parameterization for the WRF and MPAS Models,” *Applied Energy* (accepted for publication)
- 2021 Nash, R., Nouri, R., Vassel-Be-Hagh, A. (2021). “Wind Turbine Wake Control Strategies: A Review and Concept Proposal,” *Energy Conversion and Management*, 245, 114581.
- 2020 Nouri, R., Vassel-Be-Hagh, A., Archer, C. (2020) “The Coriolis Force and the Direction of Rotation of the Blades Significantly Affect the Wake of Wind Turbines,” *Applied Energy*, 277, 115511.
- 2020 Archer, C.L., Vassel-Be-Hagh, A. (2020). Corrigendum to “Review and Evaluation of Wake Loss Models for Wind Energy Applications,” [*Applied Energy* 226 (2018) 1187–1207].
- 2019 Archer, C.L., Vassel-Be-Hagh, A. (2019). “Wake Steering via Yaw Control in Multi-Turbine Wind Farms: Recommendations based on Large-Eddy Simulation,” *Sustainable Energy Technologies and Assessments*, 33, 34-43.
- 2019 Archer, C.L., Wu, S., Vassel-Be-Hagh, A., Brodie, J.F., Delgado, R., St. Pe, A., Oncley, S., Semmer, S. (2019). “Meteorological Observations of Wind Turbine Effects in the Atmospheric Boundary Layer: The VERTEX Field Campaign,” *Journal of Turbulence*, 20, 64-92.
- 2019 Zhang, W., Maleki, A., Gholipour Khajeh, M., Zhang, Y., Mortazavi, S.M., Vassel-Be-Hagh, A. (2019). “A Novel Framework for Integrated Energy Optimization of a Cement Plant: An Industrial Case Study,” *Sustainable Energy Technologies and Assessments*, 35, 245-256.
- 2019 Dittner, M.E., Vassel-Be-Hagh, A. (2019). “Advances in Wind Power Forecasting,” *Lecture Notes in Energy*, 70, 37-57.
- 2018 Archer, C.L., Vassel-Be-Hagh, A., Wu, S., Pan, Y., Yan, C., Brodie, J.F., Maguire, E. (2018). “Review and Evaluation of Wake Loss Models for Wind Energy Applications,” *Applied Energy*, 226, 1187-1207.
- 2017 Vassel-Be-Hagh, A., Iakovidis, F. (2017). “The Effect of Wind Direction on the Performance of Solar PV Plants,” *Energy Conversion and Management*, 153, 455-461.
- 2017 Vassel-Be-Hagh, A., Archer, C. (2017). “Wind Farm Hub Height Optimization,” *Applied Energy*, 195C, 905-921.
- 2017 Vassel-Be-Hagh, A., Archer, C. (2017). “Wind Farms with Counter-Rotating Wind Turbines,” *Sustainable Energy Technologies and Assessments*, 24, 19-30.
- 2015 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K., Turner, J.S. (2015). “Drag of Buoyant Vortex Rings,” *Physical Review E*, 92/4, 1-5.
- 2015 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2015). “A Balloon Bursting Underwater,” *Journal of Fluid Mechanics*, 769, 522 – 540.
- 2015 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2015) “Flow over Submerged Energy Storage Balloons in Closely and Widely Spaced Floral Configurations,” *Ocean Engineering*, 95, 59 – 77.
- 2015 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2015). “Structural Analysis of an Underwater Energy Storage Accumulator,” *Sustainable Energy Technologies and Assessments*, 11, 165 - 172.

- 2014 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2014). "Flow past an Accumulator Unit of an Underwater Energy Storage System: Three Touching Balloons in Floral Configuration," *Journal of Marine Science and Application*, 13/4: 467 – 476.
- 2014 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2014). "Underwater Compressed Air Energy Storage Improved through Vortex Hydro Energy," *Sustainable Energy Technologies and Assessments*, 7, 1 – 5.
- 2013 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2013). "Numerical Simulation of Flow past an Underwater Energy Storage Balloon," *Computers and Fluids*, 88, 272 – 286.
- 2013 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K. (2013). "Energy Storage using Weights Hydraulically Lifted above Ground," *International Journal of Environmental Studies*, 70/5, 792 – 799.
- 2013 Vassel-Be-Hagh, A., Ting, D.S.-K., Carriveau, R. (2013). "Correlating Flow Pattern with Force Coefficients in Air Flow past a Tandem Unit of Three Circular Cylinders," *International Journal of Fluid Mechanics Research*, 40/3, 235 – 253.
- 2013 Esfahani, J.A., Vassel-Be-Hagh, A. (2013). "A Numerical Study on Shear Layer Behavior in Flow over a Square Unit of Four Cylinders at Reynolds Number of 200 using the LB Method," *Progress in Computational Fluid Dynamics*, 13/4, 103 – 119.
- 2012 Esfahani, J.A., Vassel-Be-Hagh, A. (2013). "LB Simulation of Heat Transfer in Flow past a Square Unit of Four Isothermal Cylinders," *Comptes Rendus Mecanique*, 340/7, 526 – 535.

Peer-Reviewed Conference Proceedings

- 2016 Vassel-Be-Hagh, A., Archer, C., "Hub Height Optimization to Increase Energy Production of Wind Farms," *American Geophysical Union Fall Meeting*, San Francisco, USA, December 12 – 16, 2016.
- 2014 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K., "Flow-Induced Vibrations of an Underwater Energy Storage Accumulator," *Offshore Energy and Storage Symposium*, Windsor, Canada, July 10 – 11, 2014.
- 2013 Vassel-Be-Hagh, A., Carriveau, R., Ting, D.S.-K., "Flow past an Isolated Underwater Balloon," *Canadian Congress of Applied Mechanics*, Saskatoon, Canada, June 2 – 6, 2013.
- 2011 Esfahani, J.A., Vassel-Be-Hagh, A., "Employment of Lattice Boltzmann Method in Simulating Flow past Two Equal Diameter Cylinders," *Saudi Engineering Conference*, Buraydah, Saudi Arabia, December 10 – 13, 2011.
- 2011 Esfahani, J.A., Vassel-Be-Hagh, A., "An LB Study of Flow past Moderately and Widely Spaced Units of Four Cylinders: Flow Structure Simulation," *Iranian Aerospace Society International Conference*, Tehran, Iran, March 1 – 3, 2011.
- 2010 Esfahani, J.A., Vassel-Be-Hagh, A., "A Lattice Boltzmann Simulation of Cross-Flow around Four Cylinders in a Square Arrangement," *ASME Conference on Engineering Systems Design and Analysis*, Istanbul, Turkey, July 12 – 14, 2010.
- 2009 Esfahani, J.A., Vassel-Be-Hagh, A., "Studying the Lattice Boltzmann Method by Simulating Couette Flow," *Iranian Aerospace Society International Conference*, Isfahan, Iran, February 17 – 19, 2009.

TEACHING

Regular Courses

- | | | |
|--------------------------------|---------------------------|-------------|
| 1) Turbulence | Tennessee Tech University | Fall 2021 |
| 2) Atmospheric Fluid Mechanics | Tennessee Tech University | Spring 2021 |

3) Thermodynamics I	Tennessee Tech University	Spring 2021; Spring 2020; Fall 2019
4) Intermediate Fluid Mechanics	Tennessee Tech University	Fall 2020
5) Fluid Mechanics	Tennessee Tech University	Fall 2017; Spring 2018; Fall 2018 (two sections); Spring 2019; Spring 2020; Fall 2020; Fall 2021; Spring 2022
6) Conductions Heat Transfer	Tennessee Tech University	Fall 2019; Spring 2022
Directed-Study Courses		
7) Phase Change Flows	Tennessee Tech University	Spring 2021
8) Aerodynamics of Damaged Wings	Tennessee Tech University	Spring 2020
9) Integrated Storage Technologies	Tennessee Tech University	Fall 2019

SELECTED AWARDS, HONORS

Distinguished Researcher Award, ASME Student Chapter, Tennessee Tech, 2021
Wings Up 100, Tennessee Tech, 2021
Outstanding Advisor Award, ASME Student Chapter, Tennessee Tech, 2020
T&E Theorist Award, Turbulence and Energy Laboratory, University of Windsor, 2016
Mitacs-Accelerate Internship Award, Mitacs, Canada, \$21,000, 2015
Innovative Researcher Award, Turbulence and Energy Laboratory, University of Windsor, 2015
Prolific Scientific Writer Award, Turbulence and Energy Laboratory, University of Windsor, 2014
Outstanding Reviewer, Sustainable Energy Technology and Assessments, Elsevier, 2013-16
Ontario Trillium Scholarship, Government of Ontario, Canada, \$160,000, 2011 – 2015
Doctoral Entrance Scholarship, University of Windsor, Canada, \$24,000, 2011
Scientific Foundation Award, Outstanding Researcher, Mechanical Engineering Department, Ferdowsi University, 2009

SERVICE

Committees

- Search committee member, Tennessee Tech University's Mechanical Engineering Department, Fall 2021– present
- Goals and Assessment Committee Member, Tennessee Tech University's Mechanical Engineering Department, Fall 2021– present
- Graduate Committee Member, Tennessee Tech University's Mechanical Engineering Department, Fall 2018 – Spring 21
- Curriculum Committee Member, Tennessee Tech University's Mechanical Engineering Department, Spring 2018

Outreach

- Co-Led the Department's team in the 2021 Explorations in Engineering and Computing Camp, Tennessee Tech University's Mechanical Engineering Department, 2021
- An ME Department's representative in the 2020 Explorations in Engineering and Computing Camp

- Presented at 2018 and 2020 Governor’s School for Emerging Technologies at Tennessee Tech University
- Participated in several Showcase Events by presenting the Fluid Mechanics lab to the students and parents
- Logistics, Offshore Energy and Storage Symposium, Windsor, Canada, 2014
- Logistics, Canadian Science Writers Association Annual Conference, Windsor, Canada, 2014

Reviewing/Judging

- Judge for the state’s 2022 FIRST LEGO League tournament
- Judge for several Office of Research Research and Creative Inquiry Days
- Panelist, NSF’s Fluid Dynamics Program, 2021
- Panelist, NSF’s Major Research Instrumentation Program, 2020
- Reviewed for NSF’s Environmental Sustainability Program, 2021
- Reviewed for Atmosphere, Applied Energy, Sustainable Energy Technologies and Assessments, Energy Conversion and Management, Fluid Dynamics Research, Energies, International Journal of Numerical Methods for Heat & Fluid Flow, AIMS Energy, International Journal of Engineering and Technology Innovation, Journal of Energy Resources Technology (Transactions of the ASME), International Journal of Energy Research
- Program chair at Mitigating Climate Change conference, Windsor, Canada, 2021
- Program chair at Energy & Resources for Tomorrow, Windsor, Canada, 2019
- Program chair at Energy and Sustainability Conference, Windsor, Canada, 2018
- Symposium organizer at International Conference of Numerical Analysis and Applied Mathematics, Thessaloniki, Greece, 2017
- Session chair at Natural Gas and Hydrogen Storage Symposium, Windsor, Canada, 2015
- Communication chair and web development, Natural Gas and Hydrogen Storage Symposium, Windsor, Canada, 2015

Talks

- Speaker, “Underwater Compressed Air Energy Storage,” ASME Student Chapter, Cookeville, TN, 2017
- Speaker, “Wind Farm Layout Optimization,” University of Windsor, Windsor, ON, Canada, 2017

STUDENTS ADVISED/EVALUATED

Adviser

Ph.D. Students

1. Ty Hagan (Summer 2021 –)
2. Daniel T Cannon (Fall 2020 –)
3. Reza Nouri (Spring 2019 –)
4. Doug Clark (Summer 2018 – Summer 2021))

MSc Students

5. Devin Threet (co-advisor)
6. Michael Hackler (Fall 2020 – Summer 2021)
7. Hollee Sadler (Fall 2020 – Spring 2021)
8. Cody Long (Fall 2018 – Summer 2020)
9. Ryan R Nash (Fall 2018 – Spring 2020)

10. Madison E Dittner (Summer 2018 –Spring 2020)

Undergraduate Research Assistant:

11. Pierce Wooten (Fall 2021 – present): Funded via Sponsored Project
12. Brian Hawkins (Fall 2021 – present): Funded via Sponsored Project
13. Luke Olson (Fall 2021 – present): Funded via Sponsored Project
14. Olivia Cline (Fall 2021): Volunteer Researcher
15. William McCarty (Spring 2020 –Fall 2021): Funded via Sponsored Project & Recipient of the CISE grant
16. Wesley Upshur (Fall 2020 and Spring 2021): Capstone
17. Caleb Dunlap (Fall 2020 and Spring 2021): Capstone
18. Christophe Blair (Fall 2020 and Spring 2021): Capstone
19. Ty Hagan (Summer 2020 – Spring 2021): Funded via Sponsored Project
20. Henry Pace (Summer 2020 and Fall 2020): Volunteer Researcher
21. Stephen Foltz (Spring 2020 and Summer 2020): Recipient of the CISE grant
22. Adam Becklehimer (Spring 2020): Funded via Sponsored Project
23. Andrew Davis (Summer 2019 – Fall 2020): Partially Funded via CESR
24. Logan Unser (Summer 2019 – Fall 2020): Recipient of the CISE grant (twice)
25. Joshua Nichols (Summer 2019 – Summer 2020): Funded via Sponsored Project
26. Benjamin Cooper (Spring 2019, Spring 2021-Summer 2021): Volunteer Researcher
27. Jonathan Stephenson (Summer 2018): Funded via CESR
28. Trenton Preston (Summer 2018): Recipient of the CISE grant
29. Yixing Wang (Fall 2021 and Spring 2022): Undergraduate Research Course

Advisory Committee Member

30. Seyi Ayeni Ph.D., Tennessee Tech University, Advisor: Dr. Holly Stretz
31. Zhicheng Zhang, Ph.D., Tennessee Tech University, Advisor: Dr. Ismail Fidan
32. Saanyol Igbax, Ph.D., Tennessee Tech University, Advisor: Dr. Steve Idem
33. Scott Vanderlan, Ph.D., Tennessee Tech University, Advisor: Dr. Jie Cui
34. Tyler R Qualls, M.Sc., Tennessee Tech University, Advisor: Dr. Ping Chen
35. Chaitanya Kodali, Ph.D. Student, Tennessee Tech University, Advisor: Dr. Steve Idem
36. Mushrif Choudhury, Ph.D. Student, Tennessee Tech University, Advisor: Dr. Jie Cui
37. Jason Cook, Ph.D. Student, Tennessee Tech University, Advisor: Dr. Ping Chen
38. Mahdi Mohammadizade, Ph.D., Tennessee Tech, Advisor: Dr. Ismail Fidan
39. Drew E. Winder, Ph.D. Student, Tennessee Tech University, Advisor: Dr. Sally Pardue
40. Boma Kresning, Ph.D. Student, University of Rhode Island, Advisor: Dr. Reza Hashemi

AWARDS, HONORS

- 2013-16 Outstanding Reviewer, Sustainable Energy Technology and Assessments, Elsevier
- 2016 T&E Theorist Award, Turbulence and Energy Laboratory, University of Windsor
- 2011 – 2015 Ontario Trillium Scholarship, Government of Ontario, Canada, \$160,000
- 2015 Mitacs-Accelerate Internship Award, Mitacs, Canada, \$21,000
- 2015 Innovative Researcher Award, Turbulence and Energy Laboratory, University of Windsor
- 2015 Author of the Year Award, Turbulence and Energy Laboratory, University of Windsor
- 2014 Creative Researcher Award, Turbulence and Energy Laboratory, University of Windsor
- 2014 Prolific Scientific Writer Award, Turbulence and Energy Laboratory, University of Windsor
- 2013 Graduate Student Award, 24th Canadian Congress of Applied Mechanics, Saskatoon, Canada
- 2013 Author of the Year Award, Turbulence and Energy Laboratory, University of Windsor
- 2011 Doctoral Entrance Scholarship, University of Windsor, Canada, \$24,000
- 2009 Scientific Foundation Award, Outstanding Researcher, Mechanical Engineering Department, Ferdowsi University