

June 2022

**Ahmad Vasel-Be-Hagh**  
Curriculum Vitae

Assistant Professor of Mechanical Engineering  
Founding Director of Fluid Mechanics Research Laboratory  
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	P.I.	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	P.I.	Thermal treatment of nuclear plants' ice condensers using CO2 lasers <i>Tennessee Valley Authority (TVA)</i> \$250,000
2020-2021	P.I.	Development of a Laser-Based System for Maintenance of Ice Condensers <i>Tennessee Valley Authority (TVA)</i> \$185,000
2019 -2020	P.I.	Advanced wake loss modeling for large wind farms with variable wind speed and direction <i>U.S. Department of Interior (via University of Delaware)</i> \$20,715
2019 – 2020	P.I.	Application of Artificial Intelligence for Air Pollution Monitoring and Remediation using Neural Network and Deep Learning, <i>Private Industry</i> \$10,619
2016	P.I.	Investigating the impact of wind turbines on surface fluxes using computational fluid dynamics <i>First State Marine Wind LLC</i> \$45,076

**SELECTED AWARDS, HONORS**

Distinguished Researcher Award, ASME Student Chapter, Tennessee Tech University, 2021  
Wings Up 100, Tennessee Tech University, 2021  
Outstanding Advisor Award, ASME Student Chapter, Tennessee Tech University, 2020  
T&E Theorist Award, Turbulence and Energy Laboratory, University of Windsor, 2016

Mitacs-Accelerate Internship Award (\$21,000), Mitacs, Canada, 2015  
Innovative Researcher Award, Turbulence and Energy Laboratory, University of Windsor, 2015  
Prolific Scientific Writer Award, Turbulence and Energy Laboratory, University of Windsor, 2014  
Ontario Trillium Scholarship (\$160,000), Government of Ontario, Canada, 2011 – 2015  
Doctoral Entrance Scholarship (\$6,000 per year), University of Windsor, Canada, 2011  
Scientific Foundation Award, Outstanding Researcher, Mechanical Engineering Department, Ferdowsi University, 2009

## **EDITORIAL RECORDS**

### **Books**

- 2021 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2021). *Utility-scale Wind Turbines and Wind Farms*. London, UK: The Institution of Engineering and Technology (The IET). doi: 10.1049/PBPO171E
- 2020 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2020). *Environmental Management of Air, Water, Agriculture, and Energy*. Boca Raton, FL, USA: CRC Press. doi: 10.1201/9780429196607
- 2019 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2019). *Advances in Sustainable Energy*. Switzerland: Springer International Publishing. doi: 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 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2022). *Mitigating the Climate Change*. Switzerland: Springer International Publishing.
- 2021 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2021). *Sustaining Tomorrow*. Switzerland: Springer International Publishing.
- 2020 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2020). *Complementary Resources for Tomorrow*. Switzerland: Springer International Publishing.
- 2018 Vassel-Be-Hagh, A., & Ting, D. (Eds.). (2018). *The Energy Mix for Sustaining Our Future: Selected Papers from Proceedings of Energy and Sustainability*. Switzerland: Springer International Publishing.
- 2017 Vassel-Be-Hagh, A. (Ed.). (2017) *Proceedings of the International Conference of Numerical Analysis and Applied Mathematics*. 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 A. Vasel-Be-Hagh & D. Ting (Eds.), *Utility-Scale Wind Turbines and Wind Farms* (pp. 1-15). London, UK: The Institute of Engineering and Technology.
- 2021 Unser, L., & Vasel-Be-Hagh, A. (2021). Chapter 3: Scaling Utility-Scale Wind Turbines. In A. Vasel-Be-Hagh & D. Ting (Eds.), *Utility-Scale Wind Turbines and Wind Farms* (pp. 39-47). London, UK: The Institute of Engineering and Technology.
- 2020 Unser, L., & Vasel-Be-Hagh, A. (2020). Chapter 10: A Preliminary Evaluation on the Performance of Diffuser-augmented Vertical Axis Wind Turbines. In A. Vasel-Be-Hagh & D. Ting (Eds.), *Complementary Resources for Tomorrow* (pp. 163-174). Switzerland: Springer Nature.
- 2020 Long, C.S., & Vasel-Be-Hagh, A. (2020). Chapter 6: Storage-Integrated Energy Harvesters. In A. Vasel-Be-Hagh & D. Ting (Eds.), *Environmental Management of Air, Water, Agriculture, and Energy* (pp. 119-140). Boca Raton, FL, USA: Routledge.
- 2017 Vasel-Be-Hagh, A. (2017) Chapter 3: Optimization of wind farms for communities. In A. Vasel-Be-Hagh & D. Ting (Eds.), *Wind and Solar Based Energy Systems for Communities* (pp. 27-61), London, UK: The Institute of Engineering and Technology.

### Peer-Reviewed Journal Articles

- 2022 Hackler, M., Vasel-Be-Hagh, A., Pardue, B. On the Effect of Reynolds number and Structural Parameters on Vortex-Induced Vibrations. *International Journal of Fluid Mechanics Research*, doi: 10.1615/InterJFluidMechRes.2022042820.
- 2022 Ma, Y., Archer, C.L., Vasel-Be-Hagh, A. (2022). “The Jensen wind farm parameterization for the WRF and MPAS models,” *Wind Energy Science Discussions*, doi: 10.5194/wes-2022-19.
- 2022 Ma, Y., Archer, C.L., Vasel-Be-Hagh, A. (2022). “Comparison of individual versus ensemble wind farm parameterizations inclusive of sub-grid wakes for the WRF model,” *Wind Energy*, 1-23, doi:10.1002/we.2758.
- 2021 Nash, R., Nouri, R., Vasel-Be-Hagh, A. (2021). “Wind Turbine Wake Control Strategies: A Review and Concept Proposal,” *Energy Conversion and Management*, 245, 114581.
- 2020 Nouri, R., Vasel-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., Vasel-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., Vasel-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., Vasel-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., Vasel-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 P.V. 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 L.B. 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.

## TALKS

September 2022	Active Tip Speed Ratio Control can Significantly Increase Annual Energy Production The North American Wind Energy Academy Conference, Delaware, USA
June 2022	Wind Turbine Wake Redirection via External Vanes Responsible Engineering & Living Symposium, Windsor, ON, Canada
June 2018	Negative yaw vs. positive yaw: The Coriolis or the rotor's direction of rotation Energy and Sustainability Conference, Windsor, Canada
December 2017	Wind Farm Layout Optimization University of Windsor, Windsor, ON, Canada
December 2016	Hub Height Optimization to Increase Energy Production of Wind Farms American Geophysical Union Fall Meeting, San Francisco, USA
July 2014	Flow-Induced Vibrations of an Underwater Energy Storage Accumulator Offshore Energy and Storage Symposium, Windsor, Canada
June 2013	Flow past an Isolated Underwater Balloon Canadian Congress of Applied Mechanics, Saskatoon, Canada
December 2011	Employment of Lattice Boltzmann Method in Simulating Flow past Two Equal Diameter Cylinders Saudi Engineering Conference, Buraydah, Saudi Arabia
March 2011	A Lattice Boltzmann Study of Flow past Moderately and Widely Spaced Units of Four Cylinders: Flow Structure Simulation Iranian Aerospace Society International Conference, Tehran, Iran
July 2010	A Lattice Boltzmann Simulation of Cross-Flow around Four Cylinders in a Square Arrangement ASME Conference on Engineering Systems Design and Analysis. Istanbul, Turkey
February 2009	Studying the Lattice Boltzmann Method by Simulating Couette Flow Iranian Aerospace Society International Conference, Isfahan, Iran

## 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 Fall 2021
9	Integrated Storage Technologies	Tennessee Tech University	Fall 2019

## SERVICE

### Committees

#### *Tennessee Tech University, Mechanical Engineering Department*

Fall 2021 – present	Goals and Assessment Committee	Member
Fall 2021 – Spring 2022	Search Committee, Filling Three Vacancies	Member
Fall 2018 – Spring 2021	Graduate Committee	Member
Spring 2018	Curriculum Committee	Member

#### *Tennessee Tech University, College of Engineering*

2020-2021	Planning the Hydraulics Lab for the A.I. Engineering Building	Member
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### Outreach

#### *Tennessee Tech University, TN, USA*

Summer 2022	Explorations in Engineering and Computing Camp	Co-Leader of M.E. <sup>1</sup> Department
Summer 2022	Governor's School for Emerging Technologies	R&D Team Leader
Summer 2021	Explorations in Engineering and Computing Camp	Co-Leader of M.E. Department
Summer 2020	Governor's School for Emerging Technologies	Speaker
Summer 2020	Explorations in Engineering and Computing Camp	Participant
Summer 2018	Governor's School for Emerging Technologies	Speaker
Fall 2017 – present	Fall/Spring Showcase Events	Presenting Fluids lab

#### *University of Windsor, ON, Canada*

2015	The Natural Gas and Hydrogen Storage Symposium	Communication Chair
2014	Offshore Energy and Storage Symposium	Logistics
2014	Canadian Science Writers Association Annual Conference	Logistics

### Reviewer/Judge/Chair

2022	National Science Foundation: Environmental Sustainability Program	Ad Hoc Reviewer
2022	Responsible Engineering & Living Symposium, Windsor, ON, Canada	Program/Session Chair
2022	National Science Foundation: Thermal Transport Processes Program	Panelist
2022	National Science Foundation: Thermal Transport Processes Program	Ad Hoc Reviewer
2022	Tennessee Tech University's Research and Creative Inquiry Day	Judge
2022	Tennessee's FIRST LEGO League Tournament	Judge
2021	National Science Foundation: Fluid Dynamics Program	Panelist
2020	Mitigating Climate Change Conference, Windsor, ON, Canada	Program Chair
2020	National Science Foundation: Major Research Instrumentation Program	Panelist

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<sup>1</sup> M.E.: Mechanical Engineering

2020	National Science Foundation: Environmental Sustainability Program	Ad Hoc Reviewer
2019	Energy & Resources for Tomorrow Conference, Windsor, Canada	Program/Session Chair
2018	Tennessee Tech University's Research and Creative Inquiry Day	Judge
2018	Energy and Sustainability Conference, Windsor, Canada	Program/Session Chair
2017	International Conference of Numerical Analysis and Applied Mathematics, Thessaloniki, Greece	Symposium organizer
2015	Natural Gas and Hydrogen Storage Symposium, Windsor, Canada	Session Chair

Frequently reviewing 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

## **STUDENTS ADVISED/EVALUATED**

### **Adviser**

#### Ph.D. Students

1. Warren Sims (Fall 2022 –)
2. Scott Vanderlan (Summer 2022 –), Co-advisor: Dr. Cui
3. Ty Hagan (Summer 2021 –)
4. Daniel T Cannon (Fall 2020 –)
5. Reza Nouri (Spring 2019 –)
6. Doug Clark (Summer 2018 – Summer 2021))

#### MSc Students

7. Devin Threet (Spring 2021 ), Co-advisor: Dr. Andy Pardue
8. Michael Hackler (Fall 2020 – Summer 2021)
9. Hollee Sadler (Fall 2020 – Spring 2021)
10. Cody Long (Fall 2018 – Summer 2020)
11. Ryan R Nash (Fall 2018 – Spring 2020)
12. Madison E Dittner (Summer 2018 –Spring 2020)

#### Undergraduate Research Assistant:

13. Pierce Wooten (Fall 2021 – present): Funded via Sponsored Project
14. Brian Hawkins (Fall 2021 – present): Funded via Sponsored Project
15. Luke Olson (Fall 2021 – present): Funded via Sponsored Project
16. Olivia Cline (Fall 2021): Volunteer Researcher
17. William McCarty (Spring 2020 –Fall 2021): Funded via Sponsored Project & Recipient of the CISE grant
18. Wesley Upshur (Fall 2020 and Spring 2021): Capstone

19. Caleb Dunlap (Fall 2020 and Spring 2021): Capstone
20. Christophe Blair (Fall 2020 and Spring 2021): Capstone
21. Ty Hagan (Summer 2020 – Spring 2021): Funded via Sponsored Project
22. Henry Pace (Summer 2020 and Fall 2020): Volunteer Researcher
23. Stephen Foltz (Spring 2020 and Summer 2020): Recipient of the CISE grant
24. Adam Beckleheimer (Spring 2020): Funded via Sponsored Project
25. Andrew Davis (Summer 2019 – Fall 2020): Partially Funded via CESR
26. Logan Unser (Summer 2019 – Fall 2020): Recipient of the CISE grant (twice)
27. Joshua Nichols (Summer 2019 – Summer 2020): Funded via Sponsored Project
28. Benjamin Cooper (Spring 2019, Spring 2021-Summer 2021): Volunteer Researcher
29. Jonathan Stephenson (Summer 2018): Funded via CESR
30. Trenton Preston (Summer 2018): Recipient of the CISE grant
31. Yixing Wang (Fall 2021 and Spring 2022): Undergraduate Research Course

### **Advisory Committee Member**

#### Ph.D. Students

32. Sainand Jadhav, Ph.D., Tennessee Tech University, Advisor: Dr. DuckBong Kim
33. Jimmy Meacham, Ph.D., Tennessee Tech University, Advisor: Dr. Rory Roberts
34. Trevor Kramer, Ph.D., Tennessee Tech University, Advisor: Dr. Rory Roberts
35. Saiful Islam, Ph.D., Tennessee Tech University, Advisor: Dr. DuckBong Kim
36. Seyi Ayeni, Ph.D., Tennessee Tech University, Advisor: Dr. Holly Stretz
37. Saanyol Igbax, Ph.D., Tennessee Tech University, Advisor: Dr. Steve Idem
38. Chaitanya Kodali, Ph.D., Tennessee Tech University, Advisor: Dr. Steve Idem
39. Jason Cook, Ph.D., Tennessee Tech University, Advisor: Dr. Pinggen Chen
40. Zhicheng Zhang, Ph.D., Tennessee Tech University, Advisor: Dr. Ismail Fidan
41. Mushrif Choudhury, Ph.D., Tennessee Tech University, Advisor: Dr. Jie Cui
42. Mahdi Mohammadizade, Ph.D., Tennessee Tech, Advisor: Dr. Ismail Fidan
43. Drew E. Winder, Ph.D., Tennessee Tech University, Advisor: Dr. Sally Pardue
44. Boma Kresning, Ph.D., University of Rhode Island, Advisor: Dr. Reza Hashemi

#### M.Sc. Students

45. Tyler R Qualls, M.Sc., Tennessee Tech University, Advisor: Dr. Pinggen Chen
46. Joseph Staller, M.Sc., Tennessee Tech University, Advisor: Dr. Steve Idem