

Emmanuel Branlard

Associate Professor at UMass

PhD in aerodynamics & aeroelasticity

MS in aerospace & MS in wind energy

✉ Amherst, MA, USA

@ ebranlard@umass.edu

🌐 ebranlard

Immersed in the field of wind energy since 2008, with a strong drive for theory and analytical methods. Working on low-to-mid fidelity wind turbine models and applying multi-physics approaches in topics such as system dynamics, digital-twins, aerodynamics, and structural dynamics.

Education

- 2012-2015 - **PhD at DTU** (Technical University of Denmark), Aero-Elastic Design section. Project:
(June 2015) “Wind turbines aerodynamics and aeroelasticity using vortex based methods”, under Mac Gaunaa supervision. Developed analytical models for rotor aerodynamics. Implemented a vortex-based aerodynamic code coupled to a structural solver (Hawc2).
Roskilde, Denmark
- 2010-2011 - **MS in Wind Energy at DTU** - Majors on mechanics and fluid dynamics. Focus on:
(Nov. 2011) aero-elasticity, control, wind resource and wave dynamics. *Lyngby, Denmark*
- 2006-2010 - **MS in Aerospace at SupAero** - Advanced maths and physics applied to aerospace
(July 2010) and mechanical engineering. French Graduate School of Aerospace Engineering (ISAE-SupAero).
Toulouse, France
- (June 2006) **Passed the competitive entrance exam to French elite “Grandes Ecoles”.**
- 2004-2006 - **Intensive undergraduate studies** in a national preparatory program. Fundamental studies in maths, physics and computer science. *Lycée du Parc - Lyon, France*

Work Experiences

- 2024 - **Associate Professor at UMass** (University of Massachusetts Amherst). Mechanical
(current) and industrial engineering department. *Amherst, MA, USA*
- 2018-2024 - **Senior Researcher at NREL** (National Renewable Energy Laboratory) Research and
(5½ years) development of multi-physics (hydro-servo-aero-elasticity) wind turbine models, with applications in: blade aerodynamic, blade design, aero-elastic stability analyses, digital-twins, floating turbines, wind-farm flows. Contributes to the development of NREL tools, such as OpenFAST and FAST.Farm. *Boulder, CO, USA*
- 2016-2018 - **Loads and Metocean Engineer at DONG Energy** (now Ørsted). Main developer of
(2½ years) in-house aero-elastic tool, implementation of aerodynamic and structural models. Post-processing of measurement data. Wind and Metocean assessments. Full load case simulations and preliminary load estimations. Tool developments: joint-probability, rain flow count, wind-farm induction. *Gentofte, Denmark*
- 2015 - **Postdoc at DTU**. Wind turbine aero-elasticity. Projects: wind farm optimization,
(9 months) induction zone, Hawc2 development, rain erosion, airfoil flaps. *Roskilde, Denmark*
- 2012 - **Research assistant** position at **DTU**. Fundamental wind turbine aerodynamics: ana-
(4 months) lytical vortex solutions, numerical vortex methods and wind turbines tip-losses.
Roskilde, Denmark

- 2011 - **Internship and Master thesis** at **Siemens Wind Power** on wind turbine tip-loss corrections. Review, implementation and investigation of new tip-loss models. Implementation of a free wake vortex code. Analysis of CFD data. *Boulder, CO, USA*
(6 months)
- 2010 - **Student job** at **Risø** under J. Mann supervision. Research projects related to lidars and turbulence: lidar model and simulation, systematic error, relation between spectra and wind speed PDF. Remote sensing. *Roskilde, Denmark*
(9 months)
- 2009 - **Internship and Master thesis** at **Fermilab** linear particle accelerator, under H. Edwards supervision. Particle physics and relativity. Development of a 3D space charge algorithm for particle tracking in accelerators, with application to emittance exchange. *Chicago, IL, USA*
(5 months)
- 2008-2009 - **Master thesis** at **ECN** (Energy Center of the Netherlands) under P. Eecen supervision. Analyses of wind farm and meteorological data. Project: Gusts propagation through wind farms and resulting loading on wind turbines - Followed a course on blade design by H. Snel. *Petten, The Netherlands*
(6 months)

Distinctions

- Postdoc - Received a 2 million DKK (\$200k) grant from the Danish Council for Independent Research for a project on the design and optimization of 20MW wind turbines (2016)
- PhD Award - Received the Excellent Young Wind Doctor Award from the European Academy of Wind Energy (2015).
- PhD Grant - Received the danish “Elite-researcher”(EliteForsk) travel scholarships of 300k DKK (\$45k) for talented PhD students from the minister for Education and Research (2014).
- Education - Received the French Scientific Baccalaureat with high honors (2004).
- Music - Received the 1st prize in Xylophone and Special committee prize (2003) - *Young Musician National Exam - France*

Project management and fundings

Legend: PI[†]: Principal Investigator. Project proposal written and managed by myself.

PW&AM*: I helped in the proposal writing and I am an active member of the project.

Year	Budget	Role & Project
2022 (3 y)	\$2.5M	PW&AM*. Multiyear, multilab project awarded as part of an open call from the Department of Energy (DOE), for a project on: <i>Distributed Wind Aeroelastic Modeling</i> . The partner is Sandia National Laboratory. The funding for NREL is \$1.5M.
2022 (1 y)	\$150k	PW&AM*. Subproject awarded as part of an open call from DOE, for a project on: <i>NoVo rotor, the no-vortex rotor for improved aerodynamics performances</i> . The full project has a budget of \$3M.
2022 (9 mos.)	\$55k	PI [†] . NREL seed funding for a project on: <i>Validation Study of a Vertical-Axis Wind Turbine Prototype</i> .
2021 (9 mos.)	\$63k	PI [†] . Subcontractor on a ARPA-E project developed with the industrial partner XFlow Energy. <i>Development of an Aero-elastic Coupling Between AeroDyn and OWENS</i> .
2021 (1.5 y)	\$300k	PW&AM*. Project granted from the National Offshore Wind Research & Development Consortium (NOWRDC), as a partnership between NREL and TUFTs university (lead). The NREL budget is \$100k. <i>Optimal Sensor Placement for Physics-Based Digital Twins</i> .
2020 (1.5y)	\$200k	PI [†] . Grant received from DOE as part of the Technology Commercialization Fund, for the project: <i>Offshore wind turbine digital twin for the prediction of component failures</i> .

2020 (7 mos.)	\$60k	PI [†] . NREL seed funding for a project on: <i>Mid-fidelity model development: OLAF Driver for VAWTs.</i>
2019 (2.5y)	\$200k	PI [†] . External funding provided by the industrial partner Vestas Wind Systems, for a project on <i>Mid-fidelity model development of VTS.Farm.</i>
2015 (2y)	\$200k	PI [†] . Research grant received from the Danish Council for Independent Research for a project on <i>Design and optimization of 20MW wind turbines.</i>

Teaching experiences

	2024 - Teaching MIE 440 AeroSpace Engineering	Amherst, USA
	2023 - Directed a one day seminar on <i>Practical usage of OpenFAST</i> as a side-event of the NAWEA conference.	Boulder, USA
	2022 - Directed a one day seminar on <i>Practical usage of OpenFAST</i> as a side-event of the NAWEA conference.	Delaware, USA
	2015 - Invited lecturer in the research group of Fernando Porte-Agel at the EPFL on <i>Vorticity-based methods for wind turbine aerodynamics.</i>	Lausanne, Switzerland
	2015 - Guest lecturer for the 11 th PhD Seminar (3 days) organized by the European Wind Energy Academy on <i>Aeroelasticity using vortex-based methods.</i>	Oldenburg, Germany
	2015 - Attended a one week teaching and learning course held by the learning lab of DTU.	Roskilde, Denmark
(1 month)	2013 - Teaching assistant position at DTU for the wind energy master course <i>Planning and Development of Wind Farms.</i>	Lyngby, Denmark
	2012 - Guest lecturer for the graduate course by Henrik Bredmose at DTU, on <i>Offshore wind energy.</i>	Roskilde, Denmark

Other teaching experiences

(2 years)	2002 - Mime teacher at municipal community for kids aged between 8 and 10. <i>Dallet, France</i>
-----------	---

Students advised

(1 year)	2022	PostDoc Mayank Chetan's mentor for a postdoc project on <i>Aeroelastic stability of wind turbines.</i>	NREL, USA
(current)	2021	PhD Cheng Liu's co-supervisor for a PhD project on <i>Vortex particle methods for wind energy.</i>	UMass, USA
(1 year)	2021	PhD Nasim Partovi's co-supervisor for a PhD project on <i>Digital twinning and inverse modeling approaches for wind energy.</i>	TUFTs, USA
(6 months)	2020	MS Benjamin Anderson's mentor for a research project on <i>Investigation of the nacelle blockage effect for a downwind turbine.</i> DOI:10.1088/1742-6596/1618/6/062062 ↗	NREL, USA
(6 months)	2014	MS Philippe Mercier's supervisor for a master's thesis on <i>Tree-code algorithm for large scale vortex method simulation.</i> , External Link ↗	DTU, Denmark
(3 months)	2022	BS Natalia Nieto-Wire's supervisor for a Science Undergraduate Laboratory Internship (SULI) project on <i>Wind Turbine Aeroelastic Response Predictions for Turbines with Increasingly Flexible Blades under Turbulent Wind Speed.</i> . Natalia studied at The City College of New York.	NREL, USA

2021 (4 months)	BS	Sarah LaVallie's co-supervisor. Sarah visited NREL as part of the Graduate Education for Minority Students (GEM) program. Her project was on <i>Influence of power coefficient on fatigue loads</i> . Sarah studied at the North Dakota State University, ND, External Link NREL, USA
2021 (3 months)	BS	Kelly Clevenson's supervisor for a SULI project on <i>Linearization of an aeroelastic model of an airfoil section</i> . Kelly studied at UMass, MA. NREL, USA
2020 (3 months)	BS	Kelly Clevenson's supervisor for a SULI project on <i>Augmented Kalman Filter to estimate monopile and tower loads on an offshore wind turbine</i> . Kelly studied at UMass, MA. NREL, USA
2019 (3 months)	BS	Dylan Giardina's supervisor for a SULI project on <i>Turbine load estimation using Kalman filtering</i> . Dylan studied at the Colorado State University, in Fort Collins, CO. NREL, USA

Professional stays (not conferences)

Stays - **DTU** (2019, Denmark, 2 d.), **Vestas** (2019, Denmark, 2 d.), **TU Delft** (2014, The Netherlands, 2 w.), **NTNU** (2014, Norway, 1 w.), **ULouvain** (2014, Belgium, 1 w.), **PUC Rio** (2014, Brasil, 3 d.), **NTUA** (2013, Greece, 2 mos.), **UVic** (2013, Canada, 1 mo.), **Fermilab** (2009, USA, 7 mos.), **ECN** (2008, The Netherlands, 6 mos.), **ONERA** (2014, France, 1 d.)

Invitations **EPFL** (2015, Switzerland, 2 d.)

Textbooks

- 2024 - Manwell, J., **Branlard, E.**, McGowan, J., Ram, B. 'Wind Energy Explained, Third edition'. *Wiley*, ISBN: 978-1-119-36747-5 , [External Link](#) [Wiley](#)
- 2017 - **Branlard, E.** 'Wind Turbine Aerodynamics and Vorticity-based methods: Fundamentals and recent applications'. *Springer International Publishing*, ISBN: 978-3-319-55163-0 DOI:10.1007/978-3-319-55164-7 [Springer](#)

Journal publications (preprints)

- (2024) 45. Brown, K., Bortolotti, P., **Branlard, E.**, Chetan, M., Dana, S., deVelder, N., Doubrawa, P., Hamilton, N., Ivanov, C., Jonkman, J., Kelley, C., and Zalkind, D. 'One-to-one aeroservoelastic validation of operational loads and performance of a 2.8 MW wind turbine model in OpenFAST'. *Wind Energy Science*, DOI:10.5194/wes-2023-166 [WES](#)

Journal publications

- 2024 44. **Branlard, E.**, Frontin C., Maack, J., Laird, D. 'Using intrusive approaches as a step towards accounting for stochasticity in wind turbine design'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/8/082001 [IOP Publishing](#)
- 43. **Branlard, E.**, Jonkman, J., Porter, J. H., Vijayakumar, G., Jonkman, B., Mayda, E.A., Dixon, K. 'A generalized wind turbine cross section as a reduced-order model to gain insights in blade aeroelastic challenges'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/2/022005 [IOP Publishing](#)
- 42. Boorsma, Schepers, Pirrung, Madsen, Sorensen, Griderslev, Bangga, Imiela, Croce, Cacciola, Blondel, **Branlard, E.**, Jonkman 'Challenges in Rotor Aerodynamic Modeling for Non-Uniform Inflow Conditions'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/2/022006 [IOP Publishing](#)

41. Bortolotti, P., Chetan, M., **Branlard, E.**, Jonkman, J., Platt, A., Slaughter, D., Rinker, J. 'Wind Turbine Aeroelastic Stability in OpenFAST'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/2/022018 [↗](#)
40. Collier, W., Ors, D., Barlas, T., Zahle, F., Bortolotti, P., Marten, D., Jensen, C. SL, **Branlard, E.**, Zalkind, D., Lønbæk 'Aeroelastic code comparison using the IEA 22MW reference turbine'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/5/052042 [↗](#)
39. **Branlard, E.**, Jonkman, J., Lee, B., Jonkman, B., Sigh, M., Mayda, E. A., Dixon, K. 'Improvements to the Blade Element Momentum Formulation of OpenFAST for Skewed Inflows'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/2/022003 [↗](#)
38. **Branlard, E.**, Jonkman, J., Platt, A., Thedin, R., Martinez-Tossas, L. ,Kretschmer, M. 'Development and Verification of an Improved Wake-Added Turbulence Model in FAST.Farm'. *Journal of Physics: Conference series*, DOI:10.1088/1742-6596/2767/9/092036 [↗](#)
37. Cioni, S., **Branlard, E.**, et al. 'On the characteristics of the wake of a wind turbine undergoing large motions caused by a floating structure: an insight based on experiments and multi-fidelity simulations from the OC6 Phase III Project'. *Wind Energy Science*, DOI:10.5194/wes-2023-21 [↗](#)
36. **Branlard, E.**, Jonkman, J., Brown, C., Zhang, J. (2024) 'A digital-twin solution for floating offshore wind turbines validated using a full-scale prototype'. *Wind Energy Science*, DOI:10.5194/wes-2023-50 [↗](#)
- 2023 35. Stanislawski, B.J., Thedin, R. Sharma, A., **Branlard, E.**, Vijayakumar, G., Sprague, M. 'Effect of the integral length scales of turbulent inflows on wind turbine loads'. (2023) *Renewable Energies*, 217, p119-218, DOI:10.1016/j.renene.2023.119218 [↗](#)
34. Partovi-Mehr, N., **Branlard, E.**, Song, M., Moaveni, B, Hines, E. (2023) 'Sensitivity Analysis of Modal Parameters of a Jacket Offshore Wind Turbine to Operational Conditions'. *Marine Science and Engineering*, DOI:10.3390/jmse11081524 [↗](#)
33. Boorsma, K., **Branlard, E.**, et al. (2023) 'Progress in validation of rotor aerodynamic codes using field data'. *Wind Energy Science*, DOI:10.5194/wes-2022-51 [↗](#)
32. Bergua, R., **Branlard, E.**, et al (2023) 'OC6 Project Phase III: Validation of the Aerodynamic Loading on a Wind Turbine Rotor Undergoing Large Motion Caused by a Floating Support Structure'. *Wind Energy Science*, DOI:10.5194/wes-2022-74 [↗](#)
31. Gaunaa, M., Troldborg, N., **Branlard, E.** (2023) 'A simple vortex model applied to an idealized rotor in sheared inflow'. *Wind Energy Science*, DOI:10.5194/wes-2022-94 [↗](#)
30. Shaler, K., Anderson, B., Martinez-Tossas, L., **Branlard, E.**, Johnson, N. (2023) 'Comparison of Free Vortex Wake and BEM Structural Results Against Large Eddy Simulations Results for Highly Flexible Turbines Under Challenging Inflow Conditions'. *Wind Energy Science*, DOI:10.5194/wes-2021-130 [↗](#)
- 2022 29. **Branlard, E.**, Geisler, J. (2022) 'A symbolic framework to obtain mid-fidelity models of flexible multibody systems with application to horizontal-axis wind turbines'. *Wind Energy Science*, DOI:10.5194/wes-7-2351-2022 [↗](#)
28. **Branlard, E.**, Martinez-Tossas, L., Jonkman, J. (2022) 'A time-varying formulation of the curled wake model within the FAST.Farm framework'. *Wind Energy*, DOI:10.1002/we.2785 [↗](#)
27. **Branlard, E.**, Brownstein, I., Strom, B., Jonkman, J., Dana, S., Baring-Gould, E. (2022) 'A multipurpose lifting-line flow solver for arbitrary wind energy concepts'. *Wind Energy Science*, 7, p455-467, DOI:10.5194/wes-7-455-2022 [↗](#)

26. **Branlard, E.**, Jonkman, B., Pirrung, G., Dixon, K., Jonkman, J. (2022) ‘Dynamic in-flow and unsteady aerodynamics models for modal and stability analyses in OpenFAST’. *Journal of Physics: Conference series*, 2265, DOI:10.1088/1742-6596/2265/3/032044 [↗](#)
25. J. Jonkman, **Branlard, E.**, J. Jasa (2022) ‘Influence of wind turbine design parameters on linearized physics-based models in OpenFAST’. *Wind Energy Science*, 7, p559-571, DOI:10.5194/wes-7-559-2022 [↗](#)
24. H. Asmuth, G. P. Navarro Diaz, H. A. Madsen, **Branlard, E.**, A. R. Meyer Forsting, K. Nilsson, J. Jonkman, S. Ivanell (2022) ‘Wind turbine response in waked inflow: A modelling benchmark against full-scale measurements’. *Renewable Energy*, 191, p868-887, DOI:10.1016/j.renene.2022.04.047 [↗](#)
- 2021 23. L. A Martinez-Tossas, **Branlard, E.**, K. Shaler, G. Vijayakumar, S. Ananthan, P. Sakievich, J. Jonkman (2021) ‘Numerical investigation of wind turbine wakes under high thrust coefficient’. *Wind Energy*, 25, p605-617, DOI:10.1002/we.2688 [↗](#)
22. Meyer Forsting, A., Rathmann, O.S., van der Laan, M.P., Troldborg, N., Gribbne, B., Hawkes, G., **Branlard, E.** (2021) ‘Verification of induction zone models for wind farm annual energy production estimation’. *Journal of Physics: Conference series*, 1934, p012023, DOI:10.1088/1742-6596/1934/1/012023 [↗](#)
- 2020 21. **Branlard, E.**, Meyer Forsting, A. (2020) ‘Assessing the blockage effect of wind turbines and wind farms using an analytical vortex model’. *Wind Energy*, 23, p2068-2086, DOI:10.1002/we.2546 [↗](#)
20. **Branlard, E.**, E. Quon, A. Meyer Forsting, J. King, P. Moriarty (2020) ‘Wind farm blockage effects: comparison of different engineering models’. *Journal of Physics: Conference series*, 1618, p062036, DOI:10.1088/1742-6596/1618/6/062036 [↗](#)
19. **Branlard, E.**, Giardina, D., Brown, C.S.D. (2020) ‘Augmented Kalman filter with a reduced mechanical model to estimate tower loads on a land-based wind turbine: a step towards digital-twin simulations’. *Wind Energy Science*, 5, p1155-1167, DOI:10.5194/wes-5-1155-2020 [↗](#)
18. **Branlard, E.**, Jonkman, J., Dana, S., Doubrawa, P. (2020) ‘A digital twin based on OpenFAST linearizations for real-time load and fatigue estimation of land-based turbines’. *Journal of Physics: Conference series*, 1618, p022030, DOI:10.1088/1742-6596/1618/2/022030 [↗](#)
17. Anderson, B., **Branlard, E.**, Vijayakumar, G., Johnson, N. (2020) ‘Investigation of the nacelle blockage effect for a downwind turbine’. *Journal of Physics: Conference series*, 1618, p062062, DOI:10.1088/1742-6596/1618/6/062062 [↗](#)
16. Doubrawa, P., **Branlard, E.**, et al (2020) ‘Multimodel validation of single wakes in neutral and stratified atmospheric conditions’. *Wind Energy*, 23, p2027-2055, DOI:10.1002/we.2543 [↗](#)
- 2019 15. **Branlard, E.** (2019) ‘Flexible multibody dynamics using joint coordinates and the Rayleigh-Ritz approximation: The general framework behind and beyond Flex’. *Wind Energy*, 22, p877-893, DOI:10.1002/we.2327 [↗](#)
14. **Branlard, E.**, Shields, M., Anderson, B., Damiani, R., Wendt, F., Jonkman, J., Musial, W. (2019) ‘Superelement reduction of substructures for sequential load calculations in OpenFAST’. *Journal of Physics: Conference series*, 1452, p012033, DOI:10.1088/1742-6596/1452/1/012033 [↗](#)
13. G. Vijayakumar, S. Yellapantula, **Branlard, E.**, S. Ananthan (2019) ‘Enhancement of Unsteady and 3D Aerodynamics Models using Machine Learning’. *Journal of Physics: Conference series*, 1452, p012065, DOI:10.1088/1742-6596/1452/1/012065 [↗](#)

12. Martinez-Tossas, L., **Branlard, E.** (2019) ‘The curled wake model: equivalence of shed vorticity models’. *Journal of Physics: Conference series*, 1452, p012069, DOI:10.1088/1742-6596/1452/1/012069 [↗](#)
11. Shaler, K., **Branlard, E.**, Platt, A., Jonkman, J. (2019) ‘Preliminary Introduction of a Free Vortex Wake Method Into OpenFAST’. *Journal of Physics: Conference series*, 1452, p012064, DOI:10.1088/1742-6596/1452/1/012064 [↗](#)
10. Doubrawa, P., Debnath, M., Moriarty, P., **Branlard, E.**, Herges, T., Maniaci, D., Naughton, B. (2019) ‘Benchmarks for Model Validation based on LiDAR Wake Measurements’. *Journal of Physics: Conference series*, 1256, p012024, DOI:10.1088/1742-6596/1256/1/012024 [↗](#)
- 2016 9. **Branlard, E.**, Gaunaa, M., Mercier, P., Voutsinas, S. (2016) ‘Impact of a wind turbine on turbulence: un-freezing turbulence by means of a simple vortex particle approach’. *Wind Engineering and Industrial Aerodynamics*, 151, p37-47, DOI:10.1016/j.jweia.2016.01.002 [↗](#)
- 2015 8. **Branlard, E.**, Papadakis, G., Gaunaa, M., Winckelmans, G., Larsen, T.J. (2015) ‘Aeroelastic large eddy simulations using vortex methods: unfrozen turbulent and sheared inflow’. *Journal of Physics: Conference series*, 625, p012019, DOI:10.1088/1742-6596/625/1/012019 [↗](#)
7. **Branlard, E.**, M. Gaunaa (2015) ‘Superposition of vortex cylinders for steady and unsteady simulation of rotors of finite tip-speed ratio’. 19, p1307-1323, *Wind Energy*, DOI:10.1002/we.1899 [↗](#)
6. **Branlard, E.**, Gaunaa, M. (2015) ‘Cylindrical vortex wake model: skewed cylinder, application to yawed or tilted rotors’. *Wind Energy*, 19, p345-358, DOI:10.1002/we.1838 [↗](#)
- 2014 5. **Branlard, E.**, M. Gaunaa (2014) ‘Cylindrical vortex wake model: right cylinder’. *Wind Energy*, 18, p1973-1987, DOI:10.1002/we.1800 [↗](#)
4. **Branlard, E.**, Gaunaa, M. (2014) ‘Development of new tip-loss corrections based on vortex theory and vortex methods’. *Journal of Physics: Conference series*, 555, p012012, DOI:10.1088/1742-6596/555/1/012012 [↗](#)
3. **Branlard, E.**, Gaunaa, M., Macheaux, E. (2014) ‘Investigation of a new model accounting for rotors of finite tip-speed ratio in yaw or tilt’. *Journal of Physics: Conference series*, 524, p012124, DOI:10.1088/1742-6596/524/1/012124 [↗](#)
- 2013 2. **Branlard, E.**, Pedersen, A., Mann, J., Angelou, N., Fischer, A., Mikkelsen, T., Harris, M., Slinger, C., Montes, B. ‘Retrieving wind statistics from average spectrum of continuous-wave lidar’. (2013) *Atmospheric Measurement Techniques*, 6, p1943-1977, DOI:10.5194/amt-6-1673-2013 [↗](#)
- 2012 1. **Branlard, E.**, Dixon, K., Gaunaa, M. (2012) ‘Vortex methods to answer the need for improved understanding and modelling of tip-loss factors’. *IET Renewable Power Generation*, DOI:10.1049/iet-rpg.2012.0283 [↗](#)

Conferences publications

- 2022 6. Partovi-Mehr, N., **Branlard, E.**, Bajric, A., Liberatore, S., Hines, E., Moaveni, B. (2022) ‘Sensitivity of Modal Parameters of an Offshore Wind Turbine to Operational and Environmental Factors: A Numerical Study’. *40th International Modal Analysis Conference*,

- 2019 5. Jonkman, J., Damiani, R., **Branlard, E.**, Hall, M., Robertson, A., Hayman, G. (2019) 'Substructure flexibility and member-level load capabilities for floating offshore wind turbines in OpenFAST'. *Proceedings of ASME 2019 2nd IOWTC Conference*, DOI:10.1115/IOWTC2019-7566 [↗](#)
- 2015 4. **Branlard, E.**, Troldborg, N., Gaunaa, M. (2015) 'A vortex based BEM-like algorithm accounting for wake rotation'. *Proceedings of EWEA Conference*,
3. **Branlard, E.**, Meyer, A.R., Gaunaa, M. (2015) 'Using a cylindrical vortex model to assess the induction zone in front of aligned and yawed rotors'. *Proceedings of EWEA Conference*,
- 2014 2. **Branlard, E.**, M. Gaunaa, E. Machefaux, H. Brandenborg Sørensen, N. Troldborg (2014) 'Validation of vortex code viscous models using lidar wake measurements and CFD'. *Proceedings of EWEA Conference*,
- 2012 1. **Branlard, E.**, Dixon, K. Gaunaa, M. (2012) 'An improved tip-loss correction based on vortex code results'. *Proceedings of EWEA Conference*,

Monographs - Theses

- 2015 - **Branlard, E.** 'Analysis of wind turbine aerodynamics and aeroelasticity using vortex based methods'. Risø-DTU (PhD Thesis). ISBN: 978-87-93278-44-8
- 2011 - **Branlard, E.** 'Wind-turbine tip-loss corrections. Review, implementation and investigation of new models'. Risø-DTU (Master's Thesis).
- 2009 - **Branlard, E.** 'On the implementation of a 3D space charge algorithm to understand and further study the physics of linear accelerators'. Fermilab-SupAero (Master's Thesis).
- **Branlard, E.** 'On the statistics of gusts and their propagation through a row of wind turbines'. ECN-SupAero (Master's Thesis), ECN-Wind-Memo-09-005.

Monographs - Reports

- 2024 - Bortolotti, P., **Branlard, E.**, Gupta, A., Johnson, N., Jonkman, J., Moriarty, P., Paquette, J., Snowberg, D., Veers, P. 'The Wind Turbine Rotors of the Future A Research Agenda From the Big Adaptive Rotor Project '. NREL/TR-86097
- 2020 - Shaler, K., **Branlard, E.**, Platt, A. 'OLAF User's Guide and Theory Manual'. NREL/TP-5000-75959
- Jonkman, J., **Branlard, E.**, Hall, M., Hayman, G., Platt, A., Robertson, A. 'Implementation of Substructure Flexibility and Member-Level Load Capabilities for Floating Offshore Wind Turbines in OpenFAST'. NREL/TP-5000-76822,
- Bortolotti, P., **Branlard, E.**, Platt, A., Moriarty, P., Sucameli, C., Botasso, C. 'Aeroacoustics Noise Model of OpenFAST'. NREL/TP-5000-75731,
- 2015 - **Branlard, E.** 'Vortex theory and vortex methods for wind energy'. Annex of PhD Thesis, Risø-DTU
- 2010 - **Branlard, E.** 'Wind power in arctic conditions: The experience of Greenland'. Risø-DTU-Artek.
- 2008 - Eecen, P., **Branlard, E.** 'The OWEZ Meteorological Mast; Analysis of mast-top displacements'. ECN-M-08-067.

Recent podium presentations

- 2023 - 'Accounting for stochasticity in wind turbine design using intrusive methods'. NAWEA 2023,

- ‘Improvements to the Blade Element Momentum formulation of OpenFAST for skewed and sheared inflows’. *NAWEA 2023*,
- ‘Aerodynamic stability of a wind turbine section including dynamic stall and dynamic inflow’. *WESC 2023*,
- ‘Improvements to the Blade Element Momentum formulation of OpenFAST for coned rotors’. *WESC 2023*,
- ‘Validation of a digital twin solution for floating offshore wind turbines using measurements from the full-scale TetraSpar prototype’. *WESC 2023*,
- ‘Validation of a digital twin solution for floating offshore wind turbines using measurements from the full-scale TetraSpar prototype’. *FOWT 2023*,
- 2022 - ‘Linear and nonlinear reduced order models of floating wind turbines for physics-based digital twin technologies’. *NAWEA 2022*,
- ‘Accounting for wake-added turbulence effects in wind farms using FAST.Farm’. *NAWEA 2022*,
- ‘Dynamic inflow and unsteady aerodynamics models for modal and stability analyses in OpenFAST’. *Torque 2022*,
- ‘Aeroelastic stability of a wind turbine section’. *APS DFD 2022*,
- 2021 - **Keynote speaker**, ‘Study of Wind Turbines by Academia/and Laboratories’. *NAWEA 2021*,
- ‘Digital twin for loads and fatigue estimation of fixed-bottom wind turbines’. *WESC 2021*,
- ‘A digital twin approach towards condition-based operation and maintenance’. *CRC-Offshore megastructure 2021*,
- 2020 - ‘A digital twin based on OpenFAST linearizations for real-time load and fatigue estimation of land-based turbines’. *Torque 2020*,
- ‘Wind farm blockage effects: comparison of different engineering models’. *Torque 2020*,

Opensource projects

Legend: *M*: Main author and developer. *C*: Contributor.

Domain	Repository, Role & Description
ebranlard [↗]	- pyDatView^{↗M} (81 ☆) A crossplatform GUI to plot tabulated data or pandas dataframes. - welib^{↗M} (47 ☆) Wind energy library, python and matlab tools for wind turbines analyses. - matlab2python^{↗M} (228 ☆) Simple Matlab to Python converter.
openfast [↗]	- openfast^{↗C} (417 ☆) OpenFAST turbine and wind farm simulation codes. - python-toolbox^{↗M} (67 ☆) Collection of Python tools developed for use with OpenFAST. - matlab-toolbox^{↗C} (63 ☆) Collection of Matlab tools developed for use with OpenFAST.

Services / UMass

Associate Editor	Wind Energy Science Journal (Oct 2023 - Present)
External Advisory Board	France Energy Marines (research center) (Feb 2023 - Present)
Journal reviews	
(2019-2024)	

Session chair	Torque 2024,
Conf. Scientific board	Torque 2024
Conference reviews (2019-2024)	Torque 2024 (3),
External reviews	1 NREL reports 1 (NREL-TR-86097, The Wind Turbine Rotors of the Future A Research Agenda From the Big Adaptive Rotor Project). 1 DTU report (DTU Wind Energy Report E-0243, Definition of the IEA Wind 22-Megawatt Offshore Reference Wind Turbine)
International tasks	IEA Wind Task 47 (2022-current, lead several subtasks), OC7 (2024-current)

Previous services (2019-2023)

Associate Editor	Wind Energy Science Journal (Oct 2023 - Present)
External Advisory Board	France Energy Marines (research center) (Feb 2023 - Present)
Session chair	IMECE 2022, APS 2022
Conference panelist	IPF (2023), AFLOAT (2023)
Journal reviews (2019-2024)	Wind Energy Science (9), Wind Energy (1), Energies (1), Renewable and Sustainable Energy (1), SIAM Journal on Applied Mathematics (1)
Conference reviews (2019-2023)	NAWEA 2023 (2), IMECE 2022 (6), Torque 2022 (2), AIAA Scitech 2022 (2), AIAA Scitech 2020 (4), AIAA Scitech 2019 (3), Wake Conference 2019 (1)
External reviews (2019-2023)	NREL competitiveness rewards (2), DOE Small Business Innovation Research (5), NREL reports (4)
International tasks	IEA Wind Task 47 (2022-2023, lead several subtasks), IEA Wind Task 29 (2019-2022, co-lead several subtasks), OC6 (2020-2021)
NREL groups	Member of the LGBTQIA+ employer resource group since 2022, member of the Global employer resource group since 2020, member of the DEI reading group of NREL since 2022.