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📄 [windengineeringuis.github.io](https://windengineeringuis.github.io)

Nationality: French

Born: September 1, 1989

Current position: Postdoctoral researcher

# Etienne Cheynet

## Education

2013–2016 **PhD**, *University of Stavanger (UiS)*, Stavanger, Norway.

2009–2012 **MSc**, *École Nationale Supérieure de Mécanique et d'Aérotechnique (ISAE-ENSMA)*, Futuroscope technopole, France.

## PhD thesis

**Title** Wind-induced vibrations of a suspension bridge: A case study in full-scale

**Supervisors** Prof. Jasna B. Jakobsen and Prof. Jonas Snæbjörnsson

**Description** The thesis investigates the wind-induced vibrations of the Lysefjord suspension bridge (Rogaland, Norway) from a full-scale perspective. The bridge has been instrumented since 2013 with synchronized sonic anemometers and accelerometers. In May 2014, Doppler wind lidar systems were deployed on the bridge site to study the flow around the bridge. This thesis proposed a systematic validation of the buffeting theory in full-scale, combining wind measurements and operational modal analysis.

## Experience

2019– **Post-doctoral researcher**, *University of Bergen*, Bergen, Norway.

- Processed velocity records from synchronized long-range lidars (COTUR campaign).
- Analysed two years of records from 25 sonic anemometers in Norwegian fjords.
- Proposed a method to simulate unfrozen atmospheric turbulence as a random process.
- Revisited the atmospheric data from the offshore wind park Vindeby.
- Explored full-scale offshore wind turbine vibration data from the RAVE initiative.

2016–2019 **Post-doctoral researcher**, *University of Stavanger*, Stavanger, Norway.

- Characterized atmospheric turbulence in the marine atmospheric boundary layer.
- Assessed the potential of synchronized long-range wind lidars in a wide fjord.
- Studied wind conditions in complex terrain using anemometer data and numerical methods.
- Proposed a data-driven approach to identify characteristics of vehicles crossing a bridge.
- Examined the combined wind and wave-induced response of a floating long-span bridge.
- Highlighted the flow distortion of sonic anemometers mounted on a bridge.
- Wrote a guideline to study the damping of long-span suspension bridges.
- Created the website <https://windengineeringuis.github.io/>.

2013–2016 **PhD student**, *University of Stavanger*, Stavanger, Norway.

- Demonstrated the potential of the UiS-made wind and structural monitoring system.
- Assessed the potential of a wind lidar to characterize wind turbulence at a bridge site.
- Opened up the use of short-range synchronized wind lidar instruments in wind engineering.
- Proposed a new method to estimate the wind coherence with a single lidar instrument.
- Conducted the first systematic validation of the buffeting theory in full-scale.

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## Student co-supervision

- 2021- **Mauro Ghirardelli**, *PhD*.  
Development and test of a drone-based sonic anemometer system.
- 2018-2022 **Nicolò Daniotti**, *PhD*.  
Full-scale investigation of the aerodynamic properties of a suspension bridge.
- 2019 **Julie-Ann Marie Knight**, *Msc*.  
The Influence of an Unstable Turbulent Wind Spectrum on the Loads and Motions on a Floating Offshore Wind Turbine.

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## Languages

- French Mother tongue
- English Proficient user (C1) *cf. European reference framework for Language Levels*
- Norwegian Independent User (B2)
- German Basic user (A2)

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## Computer skills

- Programming Matlab, Python
- FE software Abaqus CAE, LS-DYNA
- Miscellaneous L<sup>A</sup>T<sub>E</sub>X, Microsoft Office, HTML

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## References

### Reference 1

Prof. Jasna B. Jakobsen  
University of Stavanger  
jasna.b.jakobsen@uis.no

### Reference 2

Prof. Jonas Snæbjörnsson  
University of Reykjavík  
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### Reference 3

Prof. Joachim Reuder  
University of Bergen  
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## Peer reviews for

Scientific Reports, Engineering structures, Remote sensing, Journal of Bridge Engineering, Applied Science, Sensors, Boundary layer meteorology, Journal of wind engineering and Industrial Aerodynamic, Meteorology and Atmospheric Physics, Atmospheric Measurement Techniques, Atmospheric Chemistry and Physics.

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## Teaching experience

- 2020 & 2021: Teaching assistant: ENERGI230 Miljø og energi (UiB)
- 2020: Course responsible: ENERGI101 Introduksjon til energikjelder og forbruk (UiB)
- 2019: Teaching assistant: OFF905-1 Environmental loads on structure (UiS)
- 2018: Teaching assistant: BYG520-1 Environmental load (UiS)
- 2017: Teaching assistant: BYG550-1 Mechanical vibrations (UiS)
- 2017: Teaching assistant: OFF905-1 PhD project in civil and offshore structural engineering (UiS)

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## Projects and grants

- 2021-2024(2027): NFR FRIPRO program (12 mNOK). Large Offshore Wind Turbines (LOWT): structural design accounting for non-neutral wind conditions. Participants: UiS, UiB, SINTEF
- 2021-2022: COTUR II (900 kNOK). Analyse of the COTUR database. participants: UiB, Equinor.
- 2020-2021: UH-nett Vest (249 kNOK). Estimering av langsiktig kraftproduksjon til flytende vindparker. Participants: UiA, UiB, UiS.

## Awards

- 2019: Thomas A. Wyatt Best Paper Award
- 2013: Best poster Award at DeepWind 2013:10th Deep-Sea Offshore Wind R&D Conference

## Publications

### Peer-reviewed articles

- [1] Z. Midjiyawa, E. Cheynet, J. Reuder, H. Ágústsson, and T. Kvamsdal. Potential and challenges of wind measurements using met-masts in complex topography for bridge design: Part II–Spectral flow characteristics. *Journal of Wind Engineering and Industrial Aerodynamics*, 211:104585, 2021.
- [2] Z. Midjiyawa, E. Cheynet, J. Reuder, H. Ágústsson, and T. Kvamsdal. Potential and challenges of wind measurements using met-masts in complex topography for bridge design: Part I–Integral flow characteristics. *Journal of Wind Engineering and Industrial Aerodynamics*, 211:104584, 2021.
- [3] N. Daniotti, J. B. Jakobsen, J. Snæbjörnsson, E. Cheynet, and J. Wang. Observations of bridge stay cable vibrations in dry and wet conditions: A case study. *Journal of Sound and Vibration*, 503:116106, 2021.
- [4] E. Cheynet, M. Flügge, J. Reuder, J. B. Jakobsen, Y. Heggelund, B. Svardal, P. Saavedra Garfias, C. Obhrai, N. Daniotti, J. Berge, et al. The COTUR project: Remote sensing of offshore turbulence for wind energy application. *Atmospheric Measurement Techniques*, 14:6137–6157, 2021.
- [5] E. Cheynet, S. Liu, M. C. Ong, J. B. Jakobsen, J. Snæbjörnsson, and I. Gatin. The influence of terrain on the mean wind flow characteristics in a fjord. *Journal of Wind Engineering and Industrial Aerodynamics*, 205:104331, 2020.
- [6] E. Cheynet, N. Daniotti, J. B. Jakobsen, and J. Snæbjörnsson. Improved long-span bridge modeling using data-driven identification of vehicle-induced vibrations. *Structural Control and Health Monitoring*, 27(9):e2574, 2020.
- [7] E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Flow distortion recorded by sonic anemometers on a long-span bridge: Towards a better modelling of the dynamic wind load in full-scale. *Journal of Sound and Vibration*, 450:214–230, 2019.
- [8] J. Wang, E. Cheynet, J. P. Snæbjörnsson, and J. B. Jakobsen. Coupled aerodynamic and hydrodynamic response of a long span bridge suspended from floating towers. *Journal of Wind Engineering and Industrial Aerodynamics*, 177:19–31, 2018.

- [9] E. Cheynet, J. B. Jakobsen, and J. Reuder. Velocity spectra and coherence estimates in the marine atmospheric boundary layer. *Boundary-Layer Meteorology*, 169(3):429–460, Dec 2018.
- [10] E. Cheynet, J. B. Jakobsen, J. Snæbjörnsson, J. Reuder, V. Kumer, and B. Svardal. Assessing the potential of a commercial pulsed lidar for wind characterisation at a bridge site. *Journal of Wind Engineering and Industrial Aerodynamics*, 161:17–26, 2017.
- [11] E. Cheynet, J. B. Jakobsen, J. Snæbjörnsson, J. Mann, M. Courtney, G. Lea, and B. Svardal. Measurements of surface-layer turbulence in a wide norwegian fjord using synchronized long-range Doppler wind lidars. *Remote Sensing*, 9(10):977, 2017.
- [12] E. Cheynet, J. B. Jakobsen, J. Snæbjörnsson, N. Angelou, T. Mikkelsen, M. Sjöholm, and B. Svardal. Full-scale observation of the flow downstream of a suspension bridge deck. *Journal of Wind Engineering and Industrial Aerodynamics*, 171:261–272, 2017.
- [13] E. Cheynet, J. B. Jakobsen, and C. Obhrai. Spectral characteristics of surface-layer turbulence in the North Sea. *Energy Procedia*, 137:414–427, 2017.
- [14] E. Cheynet, J. B. Jakobsen, and S. Jonas. Damping estimation of large wind-sensitive structures. *Procedia engineering*, 199:2047–2053, 2017.
- [15] E. Cheynet, J. B. Jakobsen, B. Svardal, J. Reuder, and V. Kumer. Wind coherence measurement by a single pulsed Doppler wind lidar. *Energy Procedia*, 94:462–477, 2016.
- [16] E. Cheynet, J. B. Jakobsen, J. Snæbjörnsson, T. Mikkelsen, M. Sjöholm, J. Mann, P. Hansen, N. Angelou, and B. Svardal. Application of short-range dual-Doppler lidars to evaluate the coherence of turbulence. *Experiments in Fluids*, 57(12):1–17, 2016.
- [17] E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Buffeting response of a suspension bridge in complex terrain. *Engineering Structures*, 128:474–487, 2016.
- [18] J. B. Jakobsen, E. Cheynet, J. Snæbjörnsson, T. Mikkelsen, M. Sjöholm, N. Angelou, P. Hansen, J. Mann, B. Svardal, V. Kumer, et al. Assessment of wind conditions at a fjord inlet by complementary use of sonic anemometers and lidars. *Energy Procedia*, 80:411–421, 2015.

#### Conference proceedings and book chapters

- [1] M. Nafisifard, J. B. Jakobsen, E. Cheynet, J. Snæbjörnsson, M. Sjöholm, and T. Mikkelsen. Observations of incoming turbulent flow by dual wind lidar mounted on a bridge deck. In *6th American Association for Wind Engineering Workshop (online)*, 2021.
- [2] N. Daniotti, J. B. Jakobsen, J. Snæbjörnsson, and E. Cheynet. Observations of the turbulent near wake of a bridge deck. In *6th American Association for Wind Engineering Workshop (online)*, 2021.

- [3] E. Cheynet, J. Snæbjörnsson, and J. B. Jakobsen. Identifying traffic-induced vibrations of a suspension bridge: A modelling approach based on full-scale data. In *Dynamics of Civil Structures, Volume 2*, pages 93–101. Springer, 2020.
- [4] N. Daniotti, E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Damping estimation from full-scale traffic-induced vibrations of a suspension bridge. In *ASCE International Conference on Computing in Civil Engineering 2019. American Society of Civil Engineers*, 2019.
- [5] E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Flow distortion recorded by sonic anemometers on a long-span bridge. In *Lecture Notes in Civil Engineering*, volume 27, pages 192–206. Springer, 2019.
- [6] E. Cheynet. Influence of the measurement height on the vertical coherence of natural wind. In *Lecture Notes in Civil Engineering*, volume 27, pages 207–221. Springer, 2019.
- [7] E. Cheynet, J. Jakobsen, J. Snæbjörnsson, H. Ágústsson, and K. Harstveit. Complementary use of wind lidars and land-based met-masts for wind measurements in a wide fjord. In *Journal of Physics: Conference Series*, volume 1104, page 012028. IOP Publishing, 2018.
- [8] J. Wang, E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Time-domain analysis of wind-induced response of a suspension bridge in comparison with the full-scale measurements. In *ASME 2017 36th International Conference on Ocean, Offshore and Arctic Engineering*. American Society of Mechanical Engineers, 2017.
- [9] J. Snæbjörnsson, J. Jakobsen, E. Cheynet, and J. Wang. Full-scale monitoring of wind and suspension bridge response. In *IOP Conference Series: Materials Science and Engineering*, volume 276, page 012007. IOP Publishing, 2017.
- [10] E. Cheynet, J. Snæbjörnsson, and J. B. Jakobsen. Temperature effects on the modal properties of a suspension bridge. In *Dynamics of Civil Structures, Volume 2*, pages 87–93. Springer, Cham, 2017.
- [11] J. Snæbjörnsson, E. Cheynet, and J. Bogunovic Jakobsen. Performance evaluation of a suspension bridge excited by wind and traffic induced action. In *8th European Workshop On Structural Health Monitoring (EWSHM 2016)*, 2016.
- [12] E. Cheynet, J. B. Jakobsen, and J. Snæbjörnsson. Wind-induced vibrations monitoring with satellite navigation. In *19th Congress of IABSE, Challenges in Design and Construction of an Innovative and Sustainable Built Environment*, pages 57–64. International Association for Bridge and Structural Engineering (IABSE)., 2016.
- [13] E. Cheynet, J. B. Jakobsen, and J. Þór Snæbjörnsson. Full scale monitoring of wind and traffic induced response of a suspension bridge. In *MATEC Web of Conferences*, volume 24, page 04003. EDP Sciences, 2015.

## Others

- [1] J. Reuder, E. Cheynet, A. Clifton, M. F. van Dooren, J. Gottschall, J. B. Jakobsen, J. Mann, J. Palma, D. Schlipf, M. Sjøholm, et al. Recommendation on use of wind lidars. Technical Report H2020-MSCA-ITN-2019, Grant no. 858358, 2021.
- [2] E. Cheynet. *Wind-induced vibrations of a suspension bridge: A case study in full-scale*. PhD thesis, University of Stavanger, Norway, 2016.