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Composites Analysis and Mechanics  
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## Employment

### Development Engineer

Department of Wind and Energy Systems  
Technical University of Denmark  
Roskilde, Denmark  
21 Oct 2019 → present

### Composites Analysis and Mechanics

Technical University of Denmark  
Roskilde, Denmark  
22 Nov 2022 → present

### Wind Energy Materials and Components Division

Technical University of Denmark  
Roskilde, Denmark  
22 Nov 2022 → present

## Research outputs

### Fatigue S-N curve approach for impact loading of hyper- and visco-elastic leading edge protection systems of wind turbine blades

Hamers, T. W., Jespersen, K. M., Mikkelsen, L. P., Bech, J. I. & Johansen, N. F.-J., 2023, *43rd Risoe International Symposium on Materials Science*. IOP Publishing, Vol. 1293. 9 p. 012021. (IOP Conference Series: Materials Science and Engineering).

### High rate response of elastomeric coatings for wind turbine blade erosion protection evaluated through impact tests and numerical models

Jespersen, K. M., Eftekhari, M., Frost-Jensen Johansen, N., Bech, J. I., Mishnaevsky Jr., L. & Mikkelsen, L. P., 2023, In: *International Journal of Impact Engineering*. 179, 12 p., 104643.

### Microscopy

Jensen, N. F., 2023, Risø, Roskilde, Denmark: DTU Wind and Energy Systems. 33 p. (DTU Wind Energy I; No. I-1554).

### Estimation of leading edge erosion risk on wind turbines, repair prediction and mitigation strategy

Hasager, C. B., Hannesdóttir, Á., Badger, M., Bech, J. I., Johansen, N. F.-J., Madsen, J. V. & Göçmen, T., 2022

### Experimental study on the effect of drop size in rain erosion test and on lifetime prediction of wind turbine blades

Bech, J. I., Johansen, N. F.-J., Madsen, M. B., Hannesdóttir, Á. & Hasager, C. B., 2022, In: *Renewable Energy*. 197, p. 776-789 14 p.

### Graphene/sol-gel modified polyurethane coating for wind turbine blade leading edge protection: Properties and performance

Dashtkar, A., Johansen, N. F.-J., Mishnaevsky, L., Williams, N. A., Hasan, S. W., Wadi, V. S., Silvello, A. & Hadavinia, H., 2022, In: *Polymers and Polymer Composites*. 30, 18 p., 096739112210741.

### **Repair of Wind Turbine Blades: Costs and Quality**

Mishnaevsky Jr., L., Bendixen, B., Mahajan, P., Fæster, S., Johansen, N. F-J., Paul, D. & Fraise, A., 2022, *Turbine Technology; Artificial Intelligence, Control and Monitoring*. IOP Publishing, 8 p. 032032. (Journal of Physics: Conference Series; No. 3, Vol. 2265).

### **Technologies of Wind Turbine Blade Repair: Practical Comparison**

Mishnaevsky Jr., L., Johansen, N. F-J., Fraise, A., Fæster, S., Jensen, T. & Bendixen, B., 2022, In: *Energies*. 15, 5, 17 p., 1767.

### **Erosion safemode control demonstration**

Hasager, C. B., Bech, J. I., Hannesdóttir, Á., Madsen, J. V., Johansen, N. F-J. & Vejen, F., 2021

### **How can we combat leading-edge erosion on wind turbine blades?**

Hasager, C., Mishnaevsky Jr., L., Bak, C., Bech, J. I., Fæster, S. & Johansen, N. F-J., 2021, *DTU International Energy Report 2021: Perspectives on Wind Energy*. Holst Jørgensen, B., Hauge Madsen, P., Giebel, G., Martí, I. & Thomsen, K. (eds.). Risø, Roskilde, Denmark: DTU Wind Energy, p. 134-142 9 p.

### **Nanoengineered graphene-reinforced coating for leading edge protection of wind turbine blades**

Johansen, N. F-J., Mishnaevsky Jr., L., Dashtkar, A., Williams, N. A., Fæster, S., Silvello, A., Cano, I. G. & Hadavinia, H., 2021, In: *Coatings*. 11, 9, 18 p., 1104.

### **Rain erosion of wind turbine blades and the effect of air bubbles in the coatings**

Fæster, S., Johansen, N. F-J., Mishnaevsky, L., Kusano, Y., Bech, J. I. & Madsen, M. B., 2021, In: *Wind Energy*. 24, 10, p. 1071-1082 12 p.

### **Test Methods for Evaluating Rain Erosion Performance of Wind Turbine Blade Leading Edge Protection Systems**

Johansen, N. F-J., 2020, Kgs. Lyngby: Technical University of Denmark. 165 p. (DCAMM Special Report; No. S276).

### **Solution to minimize leading edge erosion on turbine blades**

Bech, J. I., Bak, C., Vejen, F., Madsen, M. B., Bayar, M., Skrzypinski, W. R., Kusano, Y., Halling, K. M., Saldern, M., Tilg, A-M., Fæster, S. & Johansen, N. F-J., 2019. 1 p.

### **Development of Single Point Impact Fatigue Tester (SPIFT)**

Fraise, A., Bech, J. I., Borum, K. K., Fedorov, V., Johansen, N. F-J., McGugan, M., Mishnaevsky, L. & Kusano, Y., 2018, *DTU Wind Energy*. 13 p. (DTU Wind Energy I; No. 751).

### **Impact damage reduction by structured surface geometry**

Kusano, Y., Fedorov, V., McGugan, M., Andersen, T. L. & Johansen, N. F-J., 2018, In: *Materials Letters*. 221, p. 296-300

### **Impact fatigue damage of coated glass fibre reinforced polymer laminate**

Fraise, A., Bech, J. I., Borum, K. K., Fedorov, V., Johansen, N. F-J., McGugan, M., Mishnaevsky, L. & Kusano, Y., 2018, In: *Renewable Energy*. p. 1102-1112

### **Investigation of droplet path in a rain erosion tester**

Gaunaa, M., Sørensen, N. N., Johansen, N. F-J., Olsen, A. S., Bak, C. & Andersen, R. B., 2018, In: *Journal of Physics: Conference Series*. 1037, 6, 10 p., 062030.

## **Activities**

### **Leading edge erosion of wind turbines blades: damage, material properties and load mitigation.**

Jakob Ilsted Bech (Invited speaker), Charlotte Bay Hasager (Other), Christian Bak (Other), Leon Mishnaevsky (Other), Søren Fæster (Other) & Nicolai Frost-Jensen Johansen (Other)  
22 Aug 2019 → 23 Aug 2019

### **Solution to minimize leading edge erosion on turbine blades**

Charlotte Bay Hasager (Speaker), Jakob Ilsted Bech (Other), Christian Bak (Other), Flemming Vejen (Other), Martin Bonde Madsen (Other), Mertcan Bayar (Other), Witold Robert Skrzypinski (Other), Yukihiro Kusano (Other), Kaj M. Halling (Other), Morten Saldern (Other), Anna-Maria Tilg (Other), Søren Fæster (Other) & Nicolai Frost-Jensen Johansen (Other)  
2 Apr 2019 → 4 Apr 2019

## **Awards**

### **Improving endurance of wind-turbine coatings for use in offshore environments**

Johansen, N. F., Møller, P. & Bech, J. I.

Samfinansieret - Andet

01/06/2016 → 31/05/2019

## **Projects**

### **3D imaging center**

Poulsen, H. F., Gundlach, C., Dahl, A. B., Oddershede, J., Trinderup, C. H., Simonsen, S. B., Zheng, Y., Brink, B., Lauridsen, T., Thydén, K. T. S., Sanna, S., Baier-Stegmaier, S., Bentzen, J. J., Christensen, A. N., Sørensen, H. O., Mikkelsen, L. P., Fæster, S., Johansen, N. F., Mokso, R., Kjer, H. M., Christensen, A. N., Quagliotti, D., Zhang, Y., Rasmussen, P. W. & Dahl, V. A.

01/01/2016 → 31/12/2029

### **EROSION - Wind Turbine Blade Erosion: Reducing the largest uncertainties**

Hasager, C. B., Sørensen, B. F., Bech, J. I., Bak, D. C., Skrzypinski, W. R., Mikkelsen, T., Fæster, S., Jr., L. M., Tilg, A., Hannesdóttir, Á. & Johansen, N. F.

01/04/2017 → 31/12/2021

### **Improving endurance of wind-turbine coatings for use in offshore environments**

Johansen, N. F., Bech, J. I., Thomsen, K., Petersen, T., Dyer, K. & Niordson, C. F.

Samfinansieret - Andet

01/06/2016 → 03/09/2020

## **Datasets**

### **Hyper and viscoelastic single point ball impact FEM model Abaqus data**

Jespersen, K. M. (Contributor), Johansen, N. F. (Contributor), Eftekhar, M. (Contributor), Mishnaevsky Jr, L. (Contributor), Bech, J. I. (Contributor) & Mikkelsen, L. P. (Contributor), Zenodo, 2021

DOI: 10.5281/zenodo.5788015, <https://zenodo.org/record/5788015>