



## Frede Blaabjerg (Denmark)

**“For outstanding technical contribution to the design of power management systems enabling the integration of renewable power”**

Born 6 May 1963 in Erslev (Denmark)

### Background

- After graduating from Aalborg University in 1987, Frede Blaabjerg worked for more than a year at the Danish branch of ABB electrical engineering company.
  - Since 1988 he worked and studied at the University of Aalborg, where he took a postgraduate course. In 1998 he became a full professor in Power Electronics and Drives.
  - In 2000 he was external professor at University of Padova, Italy. At the same time, he headed the wind turbine research program at the RISO Research Center (Danish National Laboratory for Sustainable Energy).
  - In 2002 he was external professor at Curtin University of Technology, Perth, Australia.
  - In 2006 to 2010, he became the Dean of the Faculty of Engineering, Science and Medicine at Aalborg University
  - In 2006 to 2012, he became editor in chief of IEEE Transactions on Power Electronics (Institute of Electrical and Electronics Engineers) publications on power electronics, in the most authoritative association of experts in the field of power electronics, electrical engineering and hardware of computing systems and networks.
  - In 2005 to 2008, Distinguished lecturer for IEEE Power Electronics Society; in 2010 to 2011, Distinguished lecturer for IEEE Industry Applications Society as well as 2017-2018.
  - Dr. Blaabjerg is the author and co-author of more than 700 journal publications, including the classic book for specialists, Control in Power Electronics. More than 650 journal papers are registered with the IEEE Xplore Digital Library, and all of them have been published in ISI journals.
  - Member of the European Power Electronics and Drives Association, IEEE Industrial Electronics Society, Committee of Industrial Power Converters, IEEE Power Electronics Society. He has been the editor of IEEE publications on Industrial and Power Electronics and Electrical Engineering, and the editor of the Danish magazine Elteknik.
  - At present, he is heading Aalborg University CORPE, Center of reliable power electronics which was initiated in 2012 and is a world leading institution.
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## **Scientific achievements**

- The sphere of Dr. Blaabjerg's research interests includes such areas as power electronics, static power converters, AC drives, power semiconductor modeling, power quality, wind turbines, special power systems, reliable and environmentally friendly inverters.
- In the 1990s, he made a number of inventions in the field of variable speed drive technology, and today they are regularly applied in wind turbines, and allow for rational generation of electricity, saving tens of millions of dollars a year. Such drives are used in industrial automation.
- During the first decade of this century, he and his team provided important solutions for turning photovoltaic plants and wind turbines to reality, which are characterized by unstable energy output in the power grid. These technologies are required for reliable and sustainable functioning of the energy systems in general. Today the installed capacity of these plants exceeds 1000 GW; for comparison, this is equivalent to the installed capacity of US power plants of all types.
- His merit, in particular, is the introduction of new conceptual methods of ensuring the reliability of power electronics for renewable power sources in order to reduce the cost of energy converters while increasing their reliability. He developed completely new design tools, and this work is carried out in very close cooperation with industrial enterprises.
- Dr. Blaabjerg has developed several energy-optimal control systems for asynchronous, inductor engines, permanent magnet motors. Innovations have yielded an increase in efficiency of 15-20% compared with standard control methods, and found application in commercial drives (Danfoss, Grundfos).
- During the recent decade, he initiated two new research areas in which universities and industry are involved. The first is improving the reliability of power electronics. Technology improvement through the use of new design methods based on real physical models will reduce the failure rate. The second is related with an increase in the stability of the power system when using a large number of power electronics converters that interact with the power grid. Those are mainly used at solar and wind power stations.
- Professor Blaabjerg is the author of more than 1100 conference/magazine articles and reports at various international conferences dedicated to the issues of power electronics and renewable energy sources.
- Dr. Blaabjerg is the most quoted author among all engineering scientists of the world. Thus, as of March 2019, the Google Scholar, Scopus and Web of Science search engines yield the following data: respectively 89000, 60000, 39000 citations and links to his articles. According to Google Scholar, Scopus and Web of Science, his Hirsch index is 140, 115 and 91, respectively.

## **Highlights**

- According to Microsoft Academic, Dr. Blaabjerg, in terms of the number of his publications and their quoting, is ranked first in the world out of more than 1.5 million leading researchers, not only in the field of electrical engineering, but also those who work in all areas of technology. Times Higher Education has defined him as the most quoted and successful researcher in the world in the field of engineering.
- In 2014 to 2017, Thomson Reuters named Blaabjerg among the World's Most Influential Scientific Minds.
- The developer has participated in more than fifty research projects of manufacturer companies. The results of his research have been used by corporations such as ABB, Grundfos, Danfoss, Vestas, Game-sa, KK-Electronics, Fuji, Mitsubishi, Rockwell Automation, Sanken, and many others.
- His credibility has attracted more than \$ 50 million for research projects aimed at reducing the increased risk of instability of the grid with multiple energy converters of photovoltaic systems and wind turbines installed.