

Research Fellow: Dr Tim Jukes (University of Nottingham, United Kingdom)

Research: “Active Flow Control on Rotor Blade using DBD Plasma Actuator and FBG Sensor”

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Institution: National Institute of Advanced Industrial Science and Technology (AIST)

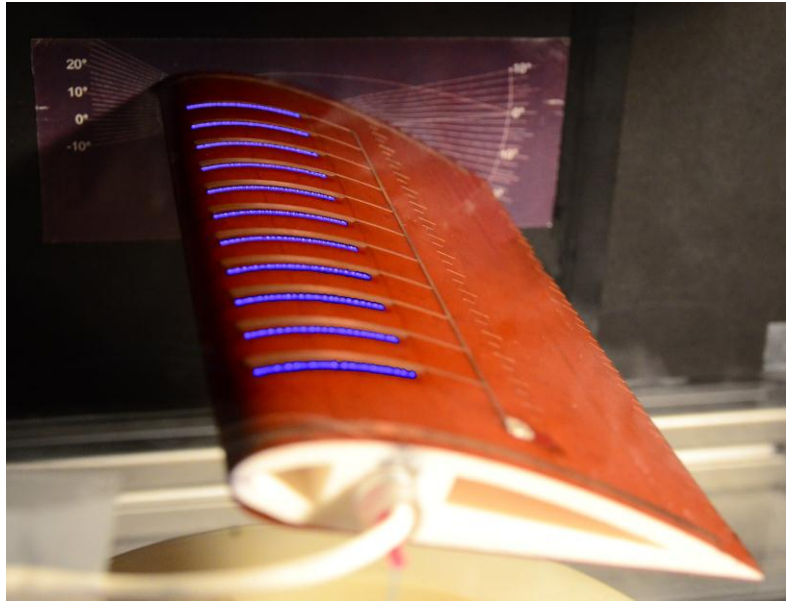
Department: Research Centre for New Fuels and Vehicle Technology

Host: Dr. Takehiko Segawa

From March 2011 to February 2012, I spent 12 month conducting research at AIST Tsukuba with Dr. Takehiko Segawa. My research efforts were based around improving the efficiency of wind turbines. We tackled the problem of flow separation over turbine blades, which leads to rapid loss of lift and drop in power output. Our vision is a system comprising a flow separation detector, using optical strain gauges, and a flow reattachment actuator, using Dielectric-Barrier-Discharge plasma actuators. We developed the detectors and actuators, and demonstrated potential for an active control system that should help improve wind turbine performance under unfavourable wind conditions.

AIST is one of the largest public research institutions in Japan, and has research centres all over the country. I worked in one of the four sites at the headquarters in Tsukuba. Tsukuba itself is a “Science City”, with over 10 research institutions. This, along with the diversity of research at AIST, makes it a very dynamic research environment. This allowed me to meet a large number of scientific researchers from diverse disciplines from all over the globe. This alone was a very rewarding experience and I gained very useful insights and contacts outside of my own discipline. I also travelled quite extensively during my time in Japan, both with work and for pleasure. I presented at 2 international conferences and gave invited lectures at the Japan Aerospace Exploration Agency (JAXA), Tokyo University of Science and Gifu University. This was a fantastic opportunity for me to visit other facilities and build contacts amongst the Japanese research community.

I had worked with my host before, as he had visited our laboratory in Nottingham for one year in 2007. This made it easy to commence my research in Japan, but I would strongly advise people to learn as much Japanese as possible before and during their stay. This will help get things done and understand the culture and people. On the whole I found Japanese researchers very kind and welcoming. My experience of Japan was very positive, and I would highly recommend prospective candidates to apply for the JSPS Fellowship. The experience of living and working in Japan is unforgettable. Japanese people are always so friendly and helpful and you will benefit greatly from this opportunity.



Prototype wind turbine blade with “plasma vortex generators”.



The Measurement and Evaluation Team at AIST Tsukuba-East.



Dinner with colleagues at Tokyo University of Science.