IPID4all Doctorate Research Exchange with University of Oldenburg
Feedback report

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Dr. Rustom Bhiladvala
8 weeks in 2015
Experimental and numerical methods on wall-bounded turbulent flows

University of Oldenburg

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Introduction

I do Master of Applied science at University of Victoria with my thesis on small-scale wall shear stress (WSS) sensors in turbulent fields. My research is about evaluating a new design (guard-heated WSS sensor) in a turbulent field with the focus on their possible applications on wind turbine blades. Considering the Wind Energy Systems was specifically focused on application of experimental and numerical methods for wind turbines and wind farms, an exchange research program in this section was an exceptional opportunity for me to explore the possible methods that I can use for carrying on my research.

I was accepted as a visitor researches from May 25, 2015 to July 17, 2015 during the third term of my MASc studies at University of Victoria. During this time, I worked under the supervision of Dr. Joachim Peinke and collaborate with his group in both simulation and experimental sections.

Research Undertaken

I spent the first 4 weeks of my stay in the simulation (CFD) group. During this period I started learning OpenFOAM, the open source software which was being extensively used by the CFD group. I did some basic simulations with this software while I was learning about the projects of other people by talking to them and attending their group meetings. My officemate during my stay was Ivan Herraez Hernandez, whom we continued working with on simulation of thermal WSS sensors in turbulent flows, after I returned to Victoria. Unfortunately, this collaboration did not continue for long due to the complexities of the topic.

The latter 4 weeks of my stay was spend at the experimental group where I was mainly involved with the study of flow over a slat-supported aerofoil using Particle Image Velocimetry (PIV) in a turbulent flow field created by smart grids in wind tunnel. During this project I learnt a lot of experimental methods and techniques from the Dominik Trapan, Tom wester, and other researchers that I was working with, picture below shows the experimental setup for the test. During these 4 weeks I also learnt about the research of the former PhD student Jarek Puczylowski who did a part of his PhD research in an exchange period in our research group; Jarek made his PhD defense during my stay at their group.

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Figure 1. Experimental setup of the PIV test that I was involved in during the second 4 weeks of my stay

Personal Experience

The 8 weeks experience was a great chance to meet researchers working on wind turbines. Other than learning technical, I got the chance to learn about the educational system in Germany. For example, I found out that in the research group that I was working with in Germany, mostly PhD students were supervising master students, while in Canada mostly professors supervise both PhD and master students. Also I found out that attending university in Germany is for free or relatively cheap, and the food is subsidized by the Government.

Visiting Oldenburg was the other aspect of my exchange program which definitely worth mentioning. I got a chance to visit some cities of Germany like Hamburg, Bremen, Cologne and get more familiar with the culture and history of this country. I definitely liked Oldenburg city as a small and old city with lots of bicycles. Besides, I got the chance to learn little bit of German (Ich spreche wenig deutsch)!

Conclusions

In general, the exchange program helped me to learn more about the experimental facilities, techniques, and software used for studying turbulent flows at University of Oldenburg. For sure, one of the goals of this research program was to investigate the possible collaboration. After my supervisor and I met and talked with the former PhD student in the CFD department, Ivan Herraez Hernandez, we established to a short collaboration with him. Besides, the exchange program helped me to learn about the culture, history and language of Germany. I am looking forward to see my friends at University of Oldenburg here in Victoria.

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and Research