JBC THE UNIVERSITY OF BRITISH COLUMBIA



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Postdoctoral Fellowship in Wind Farm Passive Flow Control

Applications are requested for a **postdoctoral fellowship** investigating passive flow control devices for improving the performance of wind farms. This project involves an industry collaboration with a Canadian wind energy start-up, <u>Biome Renewables</u>. Biome has developed a range of passive flow control technologies aimed at enhancing wake mixing within on- and off-shore wind farms. To evaluate the individual and combined effects of these devices, we will conduct large eddy simulations (LES) of single wind turbines as well as arrays of turbines in a wind farm. The research will develop reduced-order models of the turbine + passive flow control devices to evaluate interactions of the devices within the context of individual rotor performance, impacts on the wind farm performance, and coupling with the atmospheric boundary layer. The ultimate goal is to embed sets of validated engineering models within industry-standard site assessment and wind farm layout design tools to rapidly predict the benefits/drawbacks of the passive flow control devices on the wind farm performance.

The successful applicants will perform LES using <u>TOSCA</u>, an in-house computational fluid dynamics (CFD) tools based on PETSc and MPI libraries, with access to Canada's largest supercomputers. The research will be supervised by Dr. <u>Joshua Brinkerhoff</u> at the <u>UBCO CFD Lab</u> in the <u>UBC Okanagan</u> <u>School of Engineering</u> and will be in collaboration with Drs. <u>Tim Weis</u> and <u>Brian Fleck</u> at the University of Alberta.

The position is open to candidates who have completed a PhD in mechanical, energy, or aerospace engineering or a related discipline. Applicants with interests in fluid mechanics, computational fluid mechanics (CFD), numerical simulation, parallel computing, wind energy, and/or turbomachinery are encouraged to apply. Coding experience in C/C++ and prior CFD experience is essential. Experience with machine learning techniques and model reduction methods for incompressible Navier-Stokes equations is particularly beneficial.

This opportunity is available to Canadian citizens, permanent residents of Canada, and international applicants meeting the admission criteria for UBC Okanagan and School of Engineering. It is expected that successful candidates will commence from **May 1, 2024**, or as soon as possible thereafter.

Equity and diversity are essential to academic excellence. An open and diverse research team fosters the inclusion of voices that have been underrepresented or discouraged. Equity and diversity not only lead to a more fair and open society, but also improves the quality of the science and increases the opportunities to learn and grow from each other. Applications from members of groups that have been marginalized on any grounds enumerated under the B.C. Human Rights Code—including sex, sexual

orientation, gender identity or expression, racialization, disability, political belief, religion, marital or family status, age, and/or Indigeneity—are especially encouraged.

Application procedure

Candidates are asked to submit:

- A cover letter describing their research interests, experience, and motivations for graduate study
- A detailed curriculum vitae highlighting their educational and professional achievements
- A list of three professional and/or academic references
- Unofficial transcripts from their PhD degree

Interested candidates should send the above documents and direct queries to Dr. Joshua Brinkerhoff (joshua.brinkerhoff@ubc.ca).

About UBCO CFD Lab

The <u>UBCO CFD Lab</u> is a multidisciplinary team of research students, postdocs, and visiting collaborators engaging in CFD research in topics spanning wind energy, bioengineering, cryogenics, turbomachinery, and hydrogen systems—all with a focus on uncovering underlying physical mechanics via high-fidelity CFD simulations. The team has tremendous access to high-performance computing resources, giving team members unique opportunities to contribute to leading scientific challenges while conducting some of the largest-scale CFD simulations in Canada. The CFD Lab is characterized by team-work, curiosity, collaboration, and exploration. Additional information of Dr. Brinkerhoff's research is available from his research webpage: <u>https://cfdlab.ok.ubc.ca/</u>.

About Biome Renewables

This project is in collaboration with Biome Renewables, an engineering and design firm that employs the power of nature to create a sustainable future. Biome Renewables' mission is to develop and commercialize the key energy technologies that enable the global energy transition and play a key role in how the world generates power in the 21st century. In driving innovation and development, Biome seeks to increase renewable energy adoption globally and to make a measurable contribution to the UN Sustainable Development Goals 7, 8, and 13, thus maintaining a triple-bottom line focus. Additional information is available from https://www.biome-renewables.com/.

About UBC Okanagan

UBC opened its Okanagan campus in 2005 as a bold new UBC presence in the interior of British Columbia, designed to deliver on the promise of a research-intensive institution purpose-built for the 21st century. UBC's Okanagan campus is home to over 10,000 undergraduate and graduate students, 630 faculty members and nine Faculties and Schools. With the campus rapidly emerging as a research powerhouse, UBC Okanagan students receive an outstanding education in a stimulating student-centric learning environment.

UBC's Okanagan campus is situated in Kelowna on the unceded lands of the Syilx (Okanagan) Peoples.