Curriculum Vitae

Adam O'Brien

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Date of birth: 01/23/1989

Objective

To obtain a position in research and development related to numerical simulation of fluids.

Summary

My research is centered around the development of numerical algorithms for simulating fluid-particle interactions utilizing at fluid-fluid interfaces utilizing the immersed boundary method. I have taken several graduate courses in numerical methods, in the aerospace, mechanical and computer science departments at the University of Toronto. In addition to my PhD work, I maintain several computational codes on the side, including a compressible 2D Navier-Stokes solver and a smoothed-particle hydrodynamics solver. Having a vast exposure to various numerical methods courses taught in different departments makes me uniquely qualified to teach undergraduate students taking courses in applied math, linear algebra, numerical methods and computer programming. In addition to this, I also have experience leading tutorials in three different courses as a teaching assistant and through an undergraduate academic success organization, meaning I also have a skill set for teaching and interacting with undergraduate students.

Teaching Experience

TA – Fundamentals of Computer Programming   **Jan 2015–Apr 2014**
University of Toronto
Ran three tutorial sessions per week for the first year Fundamentals of Programming course at the University of Toronto. Solved example problems related to the basics of C programming for students, and assisted them with understanding course content.

Facilitator – Thermodynamics and Heat Transfer   **Sep 2010–Apr 2012**
Carleton University
Ran two academic workshops per week for second year students taking Thermodynamics and Heat Transfer as part of the Peer Assisted Study Sessions (PASS) program ran by the Student Academic Success Center (SASC).

TA – Introduction to Engineering   **Sep 2011–Dec 2011**
Carleton University
Ran the two tutorial sessions per week for the first year Introduction to Engineering course at Carleton University. The lab topics were centered around the use of matlab for numerical problems, as well as introducing CAD software. Also supervised and marked the final year design project.

Education

PhD – Department of Mechanical Engineering   **Sep 2014–Present**
University of Toronto
Thesis: Developing a numerical framework for the simulation of particle-fluid interaction at fluid-fluid interfaces utilizing the immersed boundary method.

MASc – Institute for Aerospace Studies   **Sep 2012–Aug 2014**
University of Toronto
Thesis: Numerical simulation of thermoacoustic response of laboratory scale premixed multi-slit burner flames.

BASc – Aerospace Engineering   **Sep 2008–Apr 2012**
Carleton University
Enrolled in the aerodynamics and propulsion stream. Graduated with high distinction with a 10.97/12.00 CGPA.

Awards

Ontario Graduate Scholarship   **Sep 2015–Aug 2016**
Approximate value: $15,000.00

University of Toronto Academic Scholarship   **May 2014–Aug 2014**
Approximate value: $5,000.00

Ontario Graduate Scholarship   **Sep 2012–Aug 2013**
Approximate value: $15,000.00

NSERC Undergraduate Student Research Award   **May 2012–Aug 2012**

Approximate value: $4,000.00

Developed an incompressible 2D Navier-Stokes solver utilizing the SIMPLER and SIMPLEC algorithms, written both in Matlab and C++. Also developed an unsteady panel method code in C++ for inviscid flow solutions around airfoils, utilizing the wake particle method. Also gained experience in 2D rendering in C++ using SGL.

Carleton University Academic Scholarship   **Sep 2008–Apr 2012**

Approximate value: $4,000.00/yr

NSERC Undergraduate Student Research Award   **May 2011–Aug 2011**

Approximate value: $4,000.00

Investigated the effect of Titania doping on the fracture toughness of Yttria-Stabilized Zirconia ceramic Thermal Barrier Coatings (TBC) systems for gas turbine engines. Experienced in the use of the Scanning Electron Microscope (SEM), X-ray Diffraction (XRD), and nano-indentation.

Publications

[1] P. Isaza, A. O'Brien and M. Bussmann, *Assessing Axial Heat Conduction in Moving Bed Heat Exchangers*, Submitted to the International Journal of Heat and Mass Transfer

[2] A. O'Brien, X. Huang and Q. Yang, *Erosion Resistance of Titania Co-Doped Yttria-Stabilized Zirconia*, Proceedings of Turbo-Expo 2012 (Copenhagen, 2012)

References

Professor Markus Bussmann   **Sep 2014–Present**
PhD supervisor
Phone: (416) 946 0690   E-mail: bussmann@mie.utoronto.ca

Professor Clinton Groth   **Sep 2012–Apr 2014**
MASc supervisor
Phone: (416) 667-7715   E-mail: groth@utias.utoronto.ca

Professor Edgar Matida   **May 2012–Aug 2012**
NSERC USRA supervisor
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