

# Ahmed Bakkar

Webpage: [abakkar.github.io](http://abakkar.github.io)

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## Profile

I'm a Post-Doctoral Researcher at McGill University's CFD Lab working with Prof. Wagdi Habashi. My research focuses on multi-phase flow modeling with a special interest in droplet dynamics. I have a strong background in developing numerical methods and numerical codes within a parallel environment. I also have experience in HVAC system design and in the field of renewable energy.

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## Education

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| <b>PhD in Mechanical Engineering</b><br><b>McGill University</b><br>Dissertation: "A Finite Element Level-Set Model of Supercooled Large Droplet Dynamics"              | Feb. 2018  |
| <b>M.Sc. in Mechanical Engineering</b><br><b>Cairo University</b><br>GPA: 3.77<br>Dissertation: "Humidification - dehumidification of saline water using solar chimney" | Sept. 2011 |
| <b>B.Sc. in Mechanical Engineering</b><br><b>Cairo University</b><br>Graduated with Honors (83.2%)  | July 2007  |
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## Professional Experience

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| <b>Post-Doctoral Fellow</b><br><b>Research Assistant</b><br><b>CFD Lab, McGill University</b><br>Supervised 5 graduate students in the development of various numerical codes: <ul style="list-style-type: none"><li>- Extended Finite-Element Method (XFEM) for fluid-structure interactions.</li><li>- Smoothed Particle Hydrodynamics (SPH) for high-speed multi-phase flows.</li><li>- Gappy Reduced Order Modelling (ROM) for aerospace applications.</li><li>- Numerical tools for ice accretion and shedding on helicopter blades.</li></ul> | 2018 - current<br>2017 - 2018 |
| <b>Junior Mechanical Design Engineer</b><br><b>WS Atkins, PLC</b><br><b>Dar Al Handasah (Shair and partners)</b> <ul style="list-style-type: none"><li>- Delivered custom designs for various Ventilating and Air Conditioning (VAC), plumbing, and firefighting systems.</li><li>- Negotiated design issues with various design teams, contractor, and clients.</li><li>- Provided technical solutions to meet client needs.</li></ul>   | 2008 - 2009<br>2007 - 2008    |

## Journal Publications

**A. Bakkar**, W.G. Habashi and M. Fossati, *A Multi-Scale Level-Set Approach for droplet dynamics*, In preparation.

X. Cui, **A. Bakkar** and W.G. Habashi, *A Multiphase SPH Framework for Supercooled Large Droplets Dynamics*, International Journal of Numerical Methods for Heat & Fluid Flow, Submitted.

**A. Bakkar**, W.G. Habashi, M. Fossati, and G.S. Baruzzi, *A hybrid Taylor–Galerkin variational multi-scale stabilization method for the level set equation*. Computers and Fluids, 2015. 121: p. 192–205.

## Refereed Conference Proceedings

D. Caraeni, **A. Bakkar** and W.G. Habashi, *An Extended Finite-Element Method for Modelling Fluid-Structure Interaction*, (AIAA 2019-3026791). 2019.

X. Cui, **A. Bakkar** and W.G. Habashi, *Multiphase SPH Modeling of Supercooled Large Droplets Dynamics*, 13th SPHERIC International Workshop, Paper 12, Galway, Ireland, June 25-28, 2018.

A. Kaveh, W.G. Habashi and **A. Bakkar**, *Combining CFD, EFD and FFD data via Gappy Proper Orthogonal Decomposition*, 26th Annual Conference of the CFD Society of Canada, 2018: Winnipeg, Manitoba, Canada.

**A. Bakkar**, W.G. Habashi, and M. Fossati, *Modeling of Large Droplets Impingement Using a Hybrid Taylor-Galerkin Variational Multi-Scale Stabilized Level Set Method*, (AIAA 2016-1339). 2016.

**A. Bakkar**, W.G. Habashi, and M. Fossati, *A Hybrid Taylor-Galerkin Variational Multi-Scale Stabilization Method for the Level Set Equation*, in 21st Annual Conference of the CFD Society of Canada. 2013: Sherbrooke, Quebec, Canada.

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## Honors and Awards

<b>McGill Engineering International Tuition Award</b>	2011 - 2013
McGill University	

<b>Outstanding Graduation Project Award</b>	2007
American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), Cairo Chapter	

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## Skills

- Developing large code in **FORTRAN** within the **MPI** framework.
- Developed codes in the **Finite-Volume** (FV) and **Finite-Difference** (FD) frameworks.
- Experienced user of the **PETSc**, **MUMPS** and **METIS** libraries.
- Familiar with **C++**, **C**, **Python** and **MATLAB**.
- Teaching experience: **Thermodynamics 1** (MECH 240), **Mechanical Laboratory 1** (MECH 362), **Turbomachinery and Propulsion** (MECH 535), **Finite-Element Methods in Computational Fluid Dynamics** (MECH 661).
- Language skills: **English** (native), **Arabic** (native), **French** (Conversational, B2)

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## Extra-curricular Activities

<b>VP Finance</b>	2014 - 2015
<b>Graduate Association of Mechanical Engineering Students (GAMES)</b>	
Managed the finances of the organization assuring that it was in good standing.	