



# Ahmed Bakkar

Mechanical Engineer, PhD  
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## Profile

- Postdoctoral researcher with 7+ years of experience in Computational Fluid Dynamics (CFD) for aerospace applications.
- Comprehensive knowledge of the Finite-Element Method (FEM) and modelling multi-phase flows using XFEM.
- Knowledgeable in the areas of Fluid Dynamics, Heat Transfer and Turbomachinery.
- Experience working in HVAC systems design and in renewable energy research.


## Skills

**Coding:** FORTRAN, C, C++, Python, MPI, openMP.  
**Libraries:** PETSc, Metis, MUMPS, LiS.  
**Software:** FENSAP-ICE, Fluent, openFOAM, MATLAB, ICEM, AutoCAD, Tecplot, Paraview.  
**Language:** English (native), Arabic (native), French (B2), Dutch (A1).

## Timeline


-  **Postdoctoral Research Fellow** 01. 2018  
**CFD Lab, McGill University**  Current  
Montréal, QC, Canada
- Developed a 2-year research plan in collaboration with partners (**Bell Helicopter, NSERC**).
  - Estimated research timelines and laid out work plans to ensure delivery deadlines are met.
  - Assist in managing research budget (~600K CAD).
  - Co-supervise graduate students (Ph.D. and M.Sc.) in the following research areas: fluid-structure interaction using XFEM, smoothed particle hydrodynamics for droplet dynamics, gappy reduced order modelling for data reconstruction, and ice accretion and shedding tools for helicopters.
-  **Doctor of Philosophy (Ph.D.) in Mechanical Engineering** 09. 2011  
**McGill University** 02. 2018  
Montréal, QC, Canada
- Thesis: "A Finite-Element Level-Set Eulerian Model of Supercooled Large Droplet Dynamics". 
  - Supervisors: Prof. **Wagdi Habashi** , and Dr. **Marco Fossati**. 
  - Introduced a novel approach improving the conservation characteristics of the Level-Set method.
  - Developed a general multi-phase numerical framework in Fortran using MPI.
  - Conducted a preliminary parametric study into supercooled large droplet impingement.
  - Graduate courses: Advanced Fluid Mechanics, Applied Mathematics 1, Computational Aerodynamics, Finite-Element Methods in CFD, Turbomachinery and Propulsion.
-  • Teaching Assistant: Thermodynamics I, Mechanical Laboratories I, Turbomachinery and Propulsion and Finite-Element methods in CFD.
-  **Master of Science (M.Sc.) in Mechanical Engineering** 06. 2009  
**Cairo University** 08. 2011  
Giza, Egypt
- Thesis: "Humidification-Dehumidification of Saline Water Using Solar Chimney". 
  - Supervisor: Prof. **Abdalla Hanafi**.
  - Developed a numerical model for a novel desalination plant using the Solar Chimney in MATLAB.

- Conducted a feasibility study for the proposed plant.
- Graduate courses: Theory of fine Measurements, Computational Methods in Energy, Advanced Fluid Mechanics, Turbulent Flow, Heat Convection.

 • Teaching Assistant: Powerplant Systems Design and Fundamentals of Heat Transfer.

 **Mechanical Design Engineer** 11. 2008  
**WS Atkins**  03. 2009  
 Sharjah, UAE

- Coordinated design issues with the various in-house departmental teams.
- Investigated using natural ventilation instead of conventional AC systems for an eco-lodge (LEED).
- Reviewed and adjusted thermal load calculations for smoke clearance system.
- Responded to RFIs from contractor.
- Performed detailed thermal load calculations for the various projects.

 **Junior Mechanical Design Engineer** 09. 2007  
**Dar Al-Handasah**  10. 2008  
 Giza, Egypt

- Participated in meetings with client and in-house teams to negotiate designs issues.
- Responsible for hospital room pressurization in accordance with building standards.
- Conducted thermal load calculations and system designs for various projects.
- Reviewed plumbing system design and calculations for a residential project.

 **Bachelor of Science (B.Sc.) in Mechanical Engineering** 09. 2002  
**Cairo University** 06. 2007  
 Giza, Egypt

- Graduated with Honors, ranked top 2%.

## Awards

**McGill Engineering International Tuition Award** 09. 2011

**McGill University** 04. 2014

“Funding to attract high calibre international doctoral students to the Faculty of Engineering’s PhD programs”- 8K CAD per year for a maximum of 3 years.

**Adel Barakat Graduation Project Award** 2007

**ASHRAE, Cairo Chapter**

Awarded to the best graduation project in the area of Air-Conditioning between Cairo University, Ain Shams University and Alexandria University.

## Extra-curricular Activities

**VP Finance** 01. 2014

**Graduate Association of Mechanical Engineering Students (GAMES)** 01. 2015

Mechanical Engineering Department, McGill University

- Managed the budget (~5K CAD) assuring that it was in good standing.
- Negotiated with service providers to get best deals and decided on student contribution amounts.
- Worked with various team members on organizing social events for graduate students.

**Hobbies:** Football (soccer), kickboxing, yoga, travelling and cooking.

**Please check my webpage for a list of publications** 