

Dr. Ahmed Bakkar

Mechanical Engineer, PhD 1725 rue Sanguinet, Montréal QC, H2X 3G5, Canada

+1 (514) 653 09 30 aebakkar@gmail.com linkedin.com/in/aebakkar

Profile

- Postdoctoral researcher with 7+ years of experience in Computational Fluid Dynamics (CFD) for aerospace applications.
- · Comprehensive knowledge of the Finite-Element method and modelling multi-phase flows.
- · Knowledgeable in Finite-Volume and Finite-Difference methods.
- Experience working in HVAC systems design and in renewable energy research.
- · Committed, team player, detail oriented, and flexible.
- Demonstrated research, leadership, and management skills.

Skills

Multi-phase Flows	••••	FORTRAN	••••
FEM, XFEM	••••	Python, C, C++	••••
FVM, FDM	••••	English, Arabic	••••
MPI, Parallel Programing	••••	French (conv)	••••

Timeline



01. 2018 Postdoctoral Research Fellow
Current CFD Lab, McGill University



Montréal, QC, Canada

- Develop research plans in collaboration with industry.
- · Estimate research timelines and ensure delivery deadlines are met.
- · Write grant applications and assist in managing research budget.
- Manage graduate students 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.



09. 2011 Doctor of P

02. 2018

Doctor of Philosophy in Mechanical Engineering



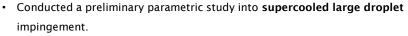
McGill University

Montréal, QC, Canada

- Introduced a novel approach improving the conservation characteristics of the Level-Set method
- · Developed a general multi-phase numerical framework in Fortran using MPI.

Timeline

Cont'd



- Supervisors: Prof. Wagdi Habashi 🗹, and Dr. Marco Fossati 🖸
- Teaching Assistant for: Thermodynamics I (MECH 240), Mechanical Laboratories I (MECH 362), Turbomachinery and Propulsion (MECH 535) and Finite-Element methods in Computational Fluid Dynamics (MECH 661).



06. 2009

Master of Science in Mechanical Engineering

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08. 2011 Cairo University

Giza, Egypt

- Developed a numerical model for a novel desalination plant using the Solar Chimney in MATLAB.
- · Conducted a feasibility study for the proposed plant.
- · Supervisor: Prof. Abdalla Hanafi.
- · Teaching Assistant for: Powerplant Systems Design and Fundamentals of Heat Transfer.



11.2008

Mechanical Design Engineer

03. 2009 WS Atkins

Sharjah, UAE

- Conducted a preliminary study into using natural ventilation for a LEED project.
- Reviewed and adjusted thermal load (HAP) calculations for smoke clearance system.
- · Responded to RFIs from contractor.
- Performed detailed thermal load (HAP) calculations for the various projects.
- Coordinated design issues with the various in-house departmental teams.



09. 2007

Junior Mechanical Design Engineer

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10. 2008 Dar Al-Handasah

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 (HAP) calculations and system designs for various projects.
- · Reviewed plumbing system design and calculations for a residential project.



09. 2002

Bachelor of Science in **Mechanical Engineering**

06. 2007 Cairo University

Giza, Egypt

• Graduated with Honors, ranked top 2%.

Journal Publications

- A. Bakkar, W.G. Habashi and M. Fossati, "A Multi-Scale Level-Set Approach for droplet dynamics", in preparation, target journal: Computers & Fluids
- X. Cui, A. Bakkar and W.G. Habashi, "A Multiphase SPH Framework for Supercooled Large Droplets Dynamics", Int Journal of Numerical Methods for Heat & Fluid Flow, accepted.
- 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 & Fluids.

Refereed Conference Proceedings

- D. Caraeni, A. Bakkar and W.G. Habashi, "An Extended Finite-Element Method for Modelling Fluid-Structure Interaction", AIAA SciTech, accepted.
- X. Ciu, A. Bakkar and W.G. Habashi, "Multiphase SPH Modeling of Supercooled Large Droplets Dynamics", 13th SPHERIC International Workshop.
 - A. Kaveh, W.G. Habashi and A. Bakkar, "Combining CFD, EFD and FFD data via Gappy Proper Orthogonal Decomposition", CFD Society of 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 SciTech.
- A. Bakkar, W.G. Habashi, and M. Fossati, "A Hybrid Taylor-Galerkin Variational Multi-Scale Stabilization Method for the Level Set Equation", CFD Society of Canada.

Honors and Awards

- 2011 McGill Engineering International Tuition Award
- 2013 McGill University

"Funding to attract high calibre international doctoral students to the Faculty of Engineering's PhD programs"- \$8,000 per year for a maximum of 3 years.

2007 Adel Barakat Graduation Project Award

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

- 2014 VP Finance
- 2015 Graduate Association of Mechanical Engineering Students (GAMES)

Mechanical Engineering Department, McGill University

- · Managed the finances of the organization assuring that it was in good standing.
- · Worked with various team members to organizing social events for graduate students.

Hobbies Football (soccer), kickboxing, travelling and cooking.