Ahmed Bakkar

Mechanical Engineer, PhD
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Profile

- Mechanical engineer with 7+ years of experience in Computational Fluid Dynamics (CFD).
- Professional experience working in HVAC systems design.
- Research experience in aerospace and renewable energy.
- Comprehensive knowledge of the Finite-Element Method (FEM) and multi-phase flow modelling.
- Knowledgeable in the areas of Fluid Dynamics, Heat Transfer and Turbomachinery.

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).

Current Position

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 established work plans to ensure delivery deadlines are met.
- Assisted 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.

Professional Experience

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

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

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.
- Performed detailed hospital room pressurization in accordance with building standards.
- Designed under-floor HVAC system for international airport control tower.
- Conducted thermal load calculations and system designs for various projects.
- Reviewed plumbing system design and calculations for a residential project.
- led a team of draftsmen delivering working drawings to contractors.

Education

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.

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

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

Please check my webpage for a list of publications