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