AHMED H. HANFY

Aerodynamic specialist | Scientific computing Engineer | Mechanical Engineer

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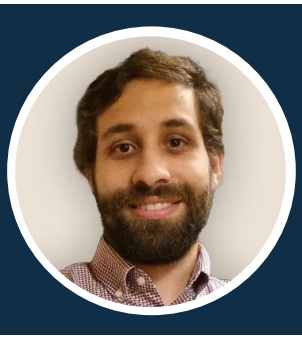

Summary

Doctoral Researcher in the Marie Curie fellowship program with 3 years of experimental aerodynamics expertise. Holds Master's in Applied Mathematics and Scientific Computing, with prior experience as a junior mechanical designer. Proficient in Python, MATLAB, and C++; skilled in data/image analysis. Familiar with Autodesk Inventor and Siemens NX for CAD modeling. Seeking to contribute expertise in aerodynamics and pursue professional growth.

WORK EXPERIENCE

11/2020-Present — Doctoral Researcher (Aerodynamic specialist)

Institute of Fluid-Flow Machinery, Polish Academy of Sciences (IMP PAN), Poland

A fellowship program under Marie Skłodowska-Curie Actions, Innovative Training Networks HORIZON 2020

11/2020-07/2021 — Project 1 (Smart Morphing and Sensing)

- Perform POD analysis on PIV Data for Airbus A320 aerofoil in transonic regime to remove noise from the velocity dataset.
- Process the velocity fluctuations in the wake of the aerofoil with a vibrating trailing edge.

08/2021-present — Project 2 (SBLI on compressor rotor profile with flow control)

- Lead the test planning to investigate manufacturing and surface roughness effects on transonic compressor fan profile.
- Coordinated the collaboration with Rolls Royce Deutschland to apply the surface texture on the suction side of the profile.
- Operate a blowdown wind tunnel with a single passage test section of a compressor fan profile.
- Carry out measurements using several techniques (Schlieren, Oil visualization, LDA, ..., etc.).
- Improve wind tunnel feedback system and Fast camera triggering using LabVIEW and DAQs devices with an accuracy of 0.06s.
- Increase the efficiency of the piping system and isolation by 30%.
- Analyse the measurement data, match, and interpret results.
- Develop Python tools and models for Image/signal processing, test data, and analysis, machine learning, etc.

03/2018-09/2018 — Junior Mechanical Designer

Taqat ME (Renewables and Environment), Egypt

- Sheet metals design and modeling solar tanks.
- Document the manufacturing process and plan the inspection procedures.
- Supervise manufacturing and inspection of solar tanks.
- Design and supervise the building of a 20k Liter water tank.

INTERNSHIPS & SCIENTIFIC VISITS

08/2022-09/2022 — Visiting Researcher

German Aerospace Centre (DLR), Cologne (Germany)

Within Marie Skłodowska-Curie Actions, a scientific secondment was made to DLR Transonic Cascade Wind Tunnel to work on unsteady measurements, such as:

- Calibration of Kulite probe and vibration sensors.
- Apply analysis on high Data Acquisition rates.
- Synchronized speed Schlieren setup.

SKILLS

LANGUAGES SKILLS

English (business proficiency)

Polish

Arabic (Native)

SOFTWARE SKILLS

CADs

Autodesk Inventor (Advanced)

Siemens NX (Basic)

AutoCAD (Intermediate)

CAEs

Ansys (Fluent)

MATLAB

LabVIEW

Programming Languages

Python (OpenCV, SciPy, Pandas, ..., etc.)

C++ (Vector, OpenMPI, ..., etc.)

Fortran

Graphic design

Photoshop

3D Max

02/2020-
05/2020

Research Internship

Institute of Fluid-Flow Machinery, Polish Academy of Sciences (IMP PAN), Poland

As a complementary course during master's study, with these objectives:

- Extracts quantitative information from interferograms for experimental study relevant to SWBLI.
- Developing MATLAB desktop app involving Fast Fourier Transform (FFT) and phase shifting.
- Improve phase detection accuracy using machine learning techniques (KNN, Linear regression, ..., etc.).

08/2013-
08/2015

Undergraduate summer trainings

- Hydro-electric stations training centre, Aswan (Egypt)
- MANTRAC (Caterpillar Dealer), Alexandria (Egypt)
- Ansys Fluent Workshop, ASME Alexandria chapter, (Egypt)

EDUCATION

11/2020–
Present
(Est Graduation, 2024)

Doctor of Philosophy (Ph.D.), Mechanical engineering

Institute of Fluid-Flow Machinery, Polish Academy of Sciences (IMP PAN), Poland

Dissertation:

"Shock Wave Boundary\Layer Interaction (SWBLI) on Suction Side of Transonic Compressor Fan Profile: low-Reynold Number and Manufacturing Effects"

Relevant coursework:

- *SWBLI and Flow Control* (University of Cambridge),
- *Recent Development in CFD* (University of Glasgow and Cadence "NUMECA"),
- *Experimental Methods in Flow Field Diagnostic* (Aix Marseille University, TU Delft and ONERA),
- *Advanced Particle Image Velocimetry measurements* (TU Delft),
- *Aerothermal Methods for Design of Turbomachinery Components and related CFD approaches* (TU Berlin, Rolls Royce Deutschland).

Conferences:

07/2023 — "Shock wave oscillations on transonic fan profile",
ISSW34 – International symposium on shock waves, Daegu, South Korea

09/2022 — "Experimental investigation of transonic effects on a fan blade representative profile",
XXV Fluid Mechanics Conference, Rzeszów, Poland

04/2022 — "Roughness effect on shock wave boundary layer interaction on transonic fan profile",
EuroMech 612-Separation control in high-speed flows-mechanisms, methods, and application, Aachen, Germany (Online)

09/2018–
05/2020

Master of Science (M.Sc.), Mathematical Engineering and Applied Mathematics

InterMaths Joint MSc (Double Degree) Programme

09/2018-07/2019 — Ivan Franko National University of Lviv (IFNUL), Ukraine

Relevant coursework:

Optimization of complex systems; Mathematical modelling and simulation; Algorithms and data structure.

09/2019-05/2020 — University of L'Aquila (UAQ), Italy

Relevant coursework:

Parallel Computing, Numerical Methods for Linear Algebra and Optimization, Stochastic Modelling and Simulations, Data Analytics, Big Data.

10/2011–
07/2016

Bachelor of Science (B.Sc.), Mechanical Engineering

Alexandria University (AU), Egypt

Relevant coursework:

Mathematics; Physics; Fluid mechanics I-II; Gas dynamics; Thermodynamics I-II; Heat transfer; Technical writing; Mechanical design I-II-III.

PROJECTS

- **Finite Fringe Analysis for Optical Measurement of Compressible Fluid Flow Parameters**
  [02/2020-05/2020]
  MATLAB GUI application, Automated analysis of interferograms (Image Analysis involves FFT) - MSc. Thesis
- **Parallel implementation of Poisson's equation**
  [05/2019]
  Final project for the parallel computing course, the code was written in both Fortran and C++, and OpenMPI was employed to solve the Poisson equation using the finite difference approach.
- **Machine learning for hydraulic condition monitoring systems**
  [06/2019]
  Final project for Data Analysis & Big Data courses in (year 1) of master's degree, the code was written in Python (Libs: Pandas and Pyspark).
- **CFD applications in oil and gas industry**
  [10/2015-07/2016]
  Multiphase flow simulation using Ansys Fluent and volume of fluid model for Multiproduct pipelines and Oil/gas separators – BSc. Project

ACTIVITIES

- **Researchers' night in Poland**
  [09/2021-10/2022]
  As a speaker in schools and science fairs to encourage junior researchers
- **Volunteer at Science Club team**
  [05/2012-06/2016]
  Positions: Co-founder, Media member Graphic designer & Team leader.
- **Volunteer at Egypt Scholars AlexS chapter**
  [09/2013-09/2014]
  Positions: Co-founder and leader of Media team.
- **Volunteer at Torpedo robotics team (student organization)**
  [02/2014–06/2016]
  Participate in the MATE ROV competition to build remotely operated vehicles (ROV) that perform underwater tasks. Roles: Head of Mechanical sub-team. Technical asset and review outputs. Boost designs using (FEA, CFD).