AHMED H. HANFY

Aerodynamic specialist | Scientific computing Engineer | Mechanical Engineer

Gdansk, Poland
ahmed.hady.hanfy92@gmail.com
(+48) 505 288 804
linkedin.com/in/engahmedhady/
github.com/EngAhmedHady

Summary

Doctoral Researcher enrolled in the prestigious Marie Curie fellowship program, with specialized experience in experimental aerodynamics. Holds Master's in Applied Mathematics and Scientific Computing, with prior experience as a junior mechanical designer. Adept in various programming languages such as Python, MATLAB, and C++; with a focus on data and image analysis. Proficient in CAD modeling using Autodesk Inventor and familiar with Siemens NX. 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

Full-time employment at IMP PAN transonic wind tunnel as experimental aerodynamics specialist, and involved in the following projects:

11/2020-07/2021

SMS Project (Vibrating trailing edge of a morphing supercritical airfoil)

- 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

TEAMAero Project (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 high accuracy.
- 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

- Designed and modeled sheet metal solar tanks with various sizes.
- Enhanced the water heating process using coil fins by 10%.
- Document the manufacturing process and plan inspection procedures.
- Supervise the manufacturing and inspection of solar tanks.
- Design and supervise the construction 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

Inventor
AutoCAD
Siemens NX

MATLAB
Ansys (Fluent)
LabVIEW

Python
(OpenCV, SciPy, Pandas, etc.)
C++
(Vector, OpenMPI, etc.)
Fortran

Photoshop
3D Max

Other skills

3D printing | Manufacturing | Pneumatics circuits | FEA | Mechanical Drawing | Robotics | MATLAB GUI | C# | JavaScript | Analysis | PCA | Dataset Analysis | Montecarlo simulation | OOP | Heat transfer | Microsoft Office | Linux |

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 (DBSCAN, 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* (AMU, 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:

09/2023 — "Surface roughness effect on boundary layer and shock-induced separation on transonic compressor profile",
2nd Colloquium on Separation Control in High-Speed Flows – mechanisms, methods, and application, Aachen, Germany

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

09/2019-05/2020 — Ivan Franko National University of Lviv (IFNUL), Ukraine

Relevant coursework:

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

09/2018-07/2019 — 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]
  Automated analysis of interferograms using FFT (MATLAB) - MSc. Thesis.
- **Parallel implementation of Poisson's equation**
  [05/2019]
  Final project for the parallel computing course (OpenMPI Fortran and C++)
- **Machine learning for hydraulic condition monitoring systems**
  [06/2019]
  Final project for Data Analysis & Big Data courses in (Python)
- **CFD applications in oil and gas industry**
  [10/2015-07/2016]
  CFD Multiphase (Ansys Fluent) – BSc. Project

ACTIVITIES

- **Researchers' night in Poland**
  [09/2021-10/2022]
  As a speaker to encourage junior researchers.
- **Volunteer at Science Club team**
  [05/2012-06/2016]
  Positions: Co-founder, Media member Graphic designer & Team leader.
- **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).

REFERENCES

- **Prof. Pawel Flaszynski**
  Head of Aerodynamics Department, Institute of fluid-flow machinery polish academy of sciences, Poland
  PhD supervisor, pflaszyn@imp.gda.pl
- **PhD. Eng. Janusz Telega**
  Experimental Aerodynamics Department, Institute of fluid-flow machinery polish academy of sciences, Poland
  M.Sc. co-advisor, januszt@imp.gda.pl
- **Assoc. Prof. Yuriy Yashchuk**
  Faculty of Applied Mathematics and Informatics, Ivan Franko National University of Lviv, Ukraine.
  M.Sc. supervisor,
  yuriy.yashchuk@lnu.edu.ua
- **Prof. Kamel Elshorbagy**
  Full professor of Fluid mechanics, Mechanical Eng. Dept. Alexandria University, Egypt.
  Torpedo team supervisor,
  kshorbagy@yahoo.com