AHMED H. HANFY

Mechanical Engineer || Scientific computing Engineer

PROFILE

Doctoral researcher in the Marie Curie fellowship program with expertise in experimental aerodynamics. Proficient in Python, MATLAB, and C++; skilled in data/image analysis. Proficient in CAD modeling using Autodesk Inventor and adept with Siemens NX. Seeking to contribute expertise, pursue learning, and advance career.

CONTACT ME

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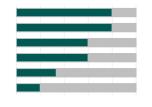
LANGUAGES

English ★★★★
Italian ★★
Polish ★
Arabic ★★★★★

SKILLS

Python
MATLAB
C++
Fortran
C#
Java script

OTHER SKILLS

OOP | OpenMPI | Machine learning | GUI | POD | PCA | Image analysis | OpenCV | Data Analysis | Signal processing | Data structure | Big Data | LabVIEW | CFD simulation | Mechanical Design | Wind tunnel operation | MS Office.

ACTIVITIES

Summer trainings [Hydro-electric stations, Diesel engines & Hydraulic maintains (MANTRAC), ASME CFD workshop].
Volunteering [researcher's night, Science Club Chairman, Torpedo robotics team: Participate in the MATE ROV competitions to perform underwater tasks].

EXPERIENCE

Doctoral Researcher (Aerodynamic specialist)   [11/2020 - Present]
Institute of fluid-flow machinery polish academy of sciences,   Gdansk (Poland)
Full-time employment at IMP PAN transonic wind tunnel as an experimental aerodynamics specialist, played a key role in various projects:
- **SMS Project (Vibrating trailing edge of a morphing supercritical airfoil)**
  - Conducted a POD analysis on PIV data, effectively eliminating noise from the velocity dataset.
  - Executed precise analysis of velocity fluctuations in the wake.
- **TEAMAero Project (SBLI on compressor rotor profile with flow control)**
  - Coordinated collaboration with the project partner Rolls Royce Deutschland.
  - Implemented various measurement techniques to capture aerodynamic performance accurately.
  - Enhanced the wind tunnel feedback system and fast camera triggering using LabVIEW and DAQ devices, achieving a remarkable accuracy of 0.6ms.
  - Analyzed the measurement data, matched, and interpreted results.
  - Developed a Python package for effectively tracking shock oscillations from noisy, low-quality schlieren images with an uncertainty of less than 15%.
  - Developed image analysis tool reconstructs an airfoil curved surface from a single camera view into a flattened top view for surface measurements.
  - Developed Python tools for signal processing, test data, and analysis, significantly enhancing understanding of flow physics.

SCIENTIFIC VISITS AND INTERNSHIPS

Visiting Researcher   [08/2022 - 09/2022]
German Aerospace Centre (DLR),   Cologne (Germany)
Unsteady measurements campaign at DLR Transonic Cascade Wind Tunnel.

Research Internship   [02/2020 - 05/2020]
Institute of fluid-flow machinery polish academy of sciences,   Gdansk (Poland)
As a complementary course during master's, accomplished the following objectives:
  - Proficiently extracted quantitative information from interferograms for experimental study relevant to SWBLI.
  - Developed a MATLAB desktop app involving FFT and phase shifting.
  - Improved phase detection accuracy through the application of machine learning techniques, including DBSCAN, Linear regression, etc.

EDUCATION

Ph.D. Mechanical engineering   [11/2020 - Present]
Marie Skłodowska-Curie Actions, Innovative Training Networks HORIZON 2020
Institute of fluid-flow machinery polish academy of sciences, Poland
(Est. Graduation, 2024)
Selected conferences:
- "Shock wave oscillations on transonic fan profile", ISSW34 – International symposium on shock waves, Daegu, South Korea, 2023.

M.Sc. Applied Mathematics and Mathematical Engineering
InterMaths Joint MSc Programme   [09/2018 - 05/2020]
  - Ivan Franko National University of Lviv (IFNUL), Ukraine   [2019 - 2020]
  - University of L'Aquila (UAQ), Italy   [2018 - 2019]
Relevant coursework:
Mathematical modelling and simulation; Algorithms and data structure. Parallel Computing, Numerical Methods for Linear Algebra and Optimization, Stochastic Modelling and Simulations, Data Analytics, Big Data.

B.Sc. Mechanical Engineering   [09/2011 - 07/2016]
Alexandria University (AU), Egypt

SELECTED PROJECTS

- Ising model simulation   (Metropolis algorithm using Fortran)
- Parallel implementation of Poisson's equation   (OpenMPI, Fortran and C++)
- Machine learning for hydraulic condition monitoring systems   (Pyspark Python)
- Finite Fringe Analysis for Optical Measurement of Compressible Fluid Flow Parameters   (MATLAB GUI application - MSc. Thesis)

ACHIEVEMENTS AND AWARDS

MATE ROV 2015, 2016 and 2017   (Torpedo robotics - AU)
- The team achieved 2nd place in the regional competition, ranking 20/600 worldwide.
- The team had international representation at:
  [Long Beach City College, USA (2017),
   NASA Neutral Buoyancy Laboratory, USA (2016),
   and Memorial University of Newfoundland, Canada (2015)].   Full CV