

Curriculum Vitae

Ahmed Hussein, PhD

Mechanical Power Eng. Dept.,
Faculty of Engineering - Ain Shams University, Cairo, Egypt
Mobile +2 010 9900 9075, Email: ahmed_eldeinhussin@eng.asu.edu.eg
Egyptian Citizen born in Cairo on 6th Feb. 1978, married with 2 children.

Education

PhD Combustion in Engines, 2013, School of Mech. Eng., University of Leeds, the UK.
Major and area of specialization: Mechanical Engineering, Thermo-fluids and Combustion.
PhD Thesis: "Renewable Fuels in Internal Combustion Engines".

MSc Mechanical Power Eng., 2006, Faculty of Engineering, Ain Shams University, Egypt.
Major and area of specialization: Mechanical Engineering, thermo-fluids and Heat engines.
MSc Thesis: "Design, construction and testing of a Gamma-type Stirling engine".

BSc Mechanical Power Eng., 2001, Faculty of Engineering, Ain Shams University, Egypt.
Honors/Merits: Ranked first on my class of 200 students (Distinction with honour degree).

Employment

Full time:

Mar. 2013 – Present:

Assistant Professor (full time), Mechanical Power Engineering, Ain Shams University, Cairo, Egypt.

Jan. 2002 – May. 2008:

Teaching assistant (full time), Mechanical Power Engineering, Ain Shams University, Cairo, Egypt.

Part time:

Sep. 2016 – Jan. 2017:

Assistant Professor (part time), Faculty of Engineering, (BUE) British University in Egypt, Cairo, Egypt.

Mar. 2014 – Jan. 2016:

Assistant Professor (part time), Faculty of Engineering, (FUE) French University in Egypt, Cairo, Egypt.

Sep. 2013 – Jan. 2014

Assistant Professor (part time), Faculty of Engineering, (MIU) Misr International University, Cairo, Egypt.

Research Experience

Research Projects

Oct. 2015 – Present:

Researcher in a joint research project, “Advanced high-efficient power-generation”, (Ad-Pow-Gen), funded by Europe-Africa (ERAfrica) and Science and Technology Development Fund, (STDF). The project aims at enhancing the efficiency of micro gas turbines using multi fuels such as hydrogen, biogas, syngas, and biodiesel, (100,000 €). My role is to investigate experimentally novel methods to enhance the combustion efficiency and reduce emissions.

Sep. 2016 – Present:

A team member in a funded project by TEMPUS, “Joint master of Mediterranean initiatives on renewable and sustainable energy” (JAMILA), (400,000 €). My role is building up postgraduate curriculums for the courses related to mechanical engineering; Solar Energy, Wind Energy, Biomass Energy, and Energy Storage.

<http://jamila.ppu.edu/en>

Mar. 2013 – Oct. 2015:

A team member in a funded project by TEMPUS, “Clean Energy and Research in Environmental Studies”, (CERES), (500,000 €). My role is building up a postgraduate curriculum for “Transport phenomena and Instructor of the workshops “Biomass Energy”.

<http://ceres.artologystudio.com/>

Oct. 2008 – Sep. 2012:

Research Assistant at the combustion lab in the School of Mechanical Engineering, the University of Leeds, the UK. My role was to investigate experimentally the combustion characterisation (speed of laminar and turbulent flames, and auto-ignition) of synthetic fuels and biofuels for industrial projects funded by Siemens and Shell.

Supervision of Postgraduate Students

A co-supervisor of 2 PhD students and 4 MSc students

- Low cost Stirling refrigerator / heat pump for drinking water (Ph.D. degree); the objective of this study is to design a low cost drinking water machine fulfilling the reverse Stirling cycle such that the heater provides hot water instead of using heating element in a typical drinking water machine, meanwhile the cooler provides the cold water.
- The performance of a diesel engine running on used oil (Ph.D. degree); the objective of this study is to recycle the waste lubricating oils such that to satisfy the requirements of diesel fuels.
- Experimental Study of a Solar Heat Exchanger (M.Sc. degree); the objective of this study is to investigate the performance of a cross-flow heat exchanger using wire mesh configurations.
- Enhancing the heat transfer of a Solar Heat Exchanger, (M.Sc. degree); the objective of this study is use nano-particles to enhance the heat transfer of a heat exchanger.
- Numerical investigation of a turbo-expander, (M.Sc. degree).); the objective of this study is to investigate the performance of a turbo-expander of Organic Rankine cycle running on different working fluids.
- Low emissions combustion technologies, (M.Sc. degree); the objective of this study is to investigate the performance of a combustion chamber fuelled by multiple fuels such as hydrogen, LPG, and liquid fuels.

Research Interests

- Energy efficiency
- Waste heat recovery.
- Low emissions combustion technologies.

Publications

Journal papers:

1. Gad-el-Hak, I., **Hussin, A. E.**, Hamed, A. M., & Mahmoud, N. A. (2017). 3D Numerical Modeling of Zeotropic Mixtures and Pure Working Fluids in an ORC Turbo-Expander. *International Journal of Turbomachinery, Propulsion and Power*, 2(1), 2
2. A. M. Hamed, **A. E. Hussin**, M. M. Kamal, A. R. Elbaz, "Combustion of a hydrogen jet normal to multiple pairs of opposing methane–air mixtures." *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy* (2017): 0957650916685944. Impact Factor : 0.689
3. Bardin ME; **El-Dein Hussin**; Gushchin PA; Vinokurov VA; Burluka AA, "Technical aspects of ethyl tert-butyl ether (ETBE) for large-scale use as gasoline improver". *Energy Technology*, vol. 2, pp.194-204. 2014. Impact Factor: 2.557
4. Burluka AA, **El-Dein Hussin**, Ling ZY, Sheppard CGW, "Effects of large-scale turbulence on cyclic variability in spark-ignition engine", *Experimental Thermal and Fluid Science*, Volume 43, November 2012, pp. 13-22. Impact Factor : 1.91
5. Burluka, AA; **El-Dein Hussin**; Sheppard, C.G.W.; Liu, K.X.; Sanderson, V., 2011, "Turbulent Combustion of Hydrogen-CO Mixtures", *Flow, Turbulence and Combustion*, vol. 86, pp.735-749, 2011. Impact Factor: 1.108
6. Burluka AA, **El-Dein Hussin** AMTA, Mandilas C, Sheppard CGW., "Experimental study of role of instabilities in turbulent premixed combustion" In: *Proceedings of the 6th International Symposium on Turbulence, Heat and Mass Transfer, Rome, Italy, 14-18 September, 2009*, pp. 651-654.
7. A.A. El-Ehwany, G. M. Hennes, **A.M.T. Hussin**, "The First Egyptian Stirling Engine", *journal of faculty of engineering ain shams university*, 2006 Impact Factor: 1.027

Teaching Experience

- **Instructor of the following Postgrad courses:**
 - **Gas Dynamics** (1), MEP522 at Ain Shams University, Spring 2016
 - **Bio-Energy**, MEP566 at Ain Shams University, Fall 2016, Spring 2016, Fall 2015, Spring 2015, Fall 2014, Spring 2014.
- **Instructor of the following Undergrad courses:**
 - **Thermodynamics**, MEP112 at Ain Shams University, Fall 2016, Spring 2016, Fall 2015, Spring 2015.
 - **Heat Transfer**, at Ain Shams University, Spring 2015, Fall 2015.
 - **Mechanical Engineering**, MEP 211 at Ain Shams University, Fall 2016, Fall 2015, Fall 2014.

- **Internal Combustion Engines** (1) MEP 362 and (2) MEP 461, at Ain Shams University, Spring 2016, Spring 2015, Spring 2014, Spring 2013.
- **Thermal Analysis of Buildings**, at Ain Shams University, Fall 2016.
- **Thermodynamics**, GEN12301–EGG25101, at MIU, Spring 2014, Fall 2014.
- **Internal Combustion Engines**, PEC409, at FUE, Spring 2015, Fall 2014, Spring 2014.
- **Conventional Thermal Power Plants**, PEC417, at FUE, Spring 2015, Fall 2014, Spring 2014.
- **Fundamentals of Heat and Mass Transfer**, EAX_4_269 at BUE, Fall 2016.
- **Supervisor of the following design project:**
 - Small Scale Stirling Engine. (2014/2015)
 - Small Scale Organic Rankine Cycle. (2015/2016)
 - Micro Gas Turbine. (2016/2017)
 - Engine performance of Ain Shams University Racing Team (ASURT). (2016/2017)

Administrative Experience

Academic Advising:

Academic adviser of undergraduate students, Energy and Renewable Energy program, (2016/2017).

My responsibility is as follows:

- Ensured students met educational goals as primary guide through degree requirements.
- Furnished course registration assistance to students.
- Advised students on degree-specific programs and procedures.
- Identified at-risk student scenarios and highlighted opportunities for academic success improvement.

Quality Assurance

Member of the quality assurance unit.

My responsibility is to provide resources and guidance on the policies, procedures and processes relating to academic standards and quality at the Faculty of Engineering Ain Shams University.

Professional Experience

- *Oct. 2015 – July 2016*

HVAC Consultant for Delta Life Assurance project at Ever Green Bldg., Cairo, Egypt.

My responsibility was to supervise the HVAC insulations and commissioning.

- *Jan. 2015*

Consultant of waste heat recovery system for the chicken farm owned by Oceania Engineering System, Egypt. My responsibility was to provide solutions to make the farm self-sustain from an energy point of view.

- *Mar. 2014.*

Consultant of waste heat recovery system for the 50 MWe power plant owned by Kahraba and located at Borg El-Arab, Egypt. My responsibility was to provide solutions to recover the waste heat within the exhaust gases leaving sets of gas engines.

Technical Skills

- Excellent experience of experiment design, fabrication and measurements.
- Proficient in operating combustion vessels dedicated to studying flame characteristics such as laminar and turbulent burning velocities, the fuel injection and auto-ignition.
- Proficient in operating and maintenance micro gas turbines.
- Proficient in operating and maintenance teaching equipments.
- Proficient in operating research engines (both commercial and in-house designed).
- Experience in setup both natural light and schlieren imaging techniques.
- Experience in installing and performing Particle Image Velocimetry, PIV, and Laser Doppler Velocimetry, LDV, techniques and dealing with their software.
- Experience in calibrating flow meters, thermocouples and dynamic pressure transducers.
- Experience in design, constructing and testing Stirling Engines.
- Experience in Waste Heat Recovery solutions for industrial applications.

Computing Skills

- Data reduction, processing and presentation using Origin Lab, Matlab programming including image processing Toolbox and PIVMat Toolbox for PIV data analysis and post-processing.
- Proficient in the use of AutoCAD, Microsoft office, (HAP) Hourly Analysis Program for HVAC System Design Software, and (EES) Engineering Equation Solver.

Presentations and Courses Attended

Delivered Presentations

- “A Novel Combustor of Micro Gas Turbine” a presentation given during the consortium annual meeting of Ad-Pow-Gen, South Africa, 3rd September 2015
- “Over view of my Research Activities” a presentation given during my visit to the University of South Africa, 29th August 2015.
- “Fundamental Study of Turbulence characteristics”, Mechanical Engineering Postgraduate Research Day, 16th July 2010.
- Monthly presentations given to the combustion research group.

Presented Posters

- “Studying the combustion properties of biofuel”, IOP Combustion Physics Group: Meeting day in Loughborough University, September 2009.
- “Turbulence and Cyclic Variation in Spark Ignition Engines”, IOP Combustion Physics Group: Meeting day in Loughborough University, September 2011.
- “Cyclic Variation of Renewable Fuels in Spark Ignition Engines”, Mechanical Engineering Postgraduate Research Day, July 2011.

Attended Seminars

- UnICEG meeting, “Engine Modelling & Measurements”, Birmingham University, 16th Dec 2008.
- DANTEC DYNAMICS Seminar, “PIV / LIF Imaging”, Leeds University, 3rd June 2009.
- A lecture by Prof. Ahmed Zewail, Nobel Laureate (Chemistry 1999) from California Institute of Technology, “The Mysteries of Time”, York University, 30th Oct 2009.

Professional Training

- PV System Design and Installation by the Department of Electrical and Computer Engineering, University of Cyprus, Cyprus, 6th-10th March 2017
- Biomass Energy by the School of Engineering, Staffordshire University, UK, 24th - 27th Sept. 2015
- Technical Teaching Equipment provided by Edibon, Spain 2014
 - Computer Controlled Thermal Solar Energy Unit (20/05/2014)
 - Computer Controlled Wind Energy Unit (21/05/2014)

- Researcher Skills Training and Development provided by Leeds University
 - Health and Safety course (06/11/2008).
 - Laser Safety (27/11/2008).
 - Matlab and Simulink (29-30/04/2009)
 - Introduction to Lab view (07/10/2009)
 - Giving Effective Seminar and Conference Presentations (03/11/2009)
 - How Vital are your Statistics (13-14/01/2010)
 - Working with MS Word to Produce Long Documents (27/07/2010)
 - Endnote (20/09/2010)
 - Demonstrating and Teaching in Labs and Practical Classes (19/01/2011)
 - Lab view Core 1 and Core 2 (09-13/01/2012).

- Central Air Conditioning Design for Hotels provided by Miraco Carrier Egypt (12-17/07/2008).

- F.L.D.P. (Faculty and Leadership Department Project) provided by Ain Shams University (2006)
 - Effective teaching
 - Effective communication
 - Methods of scientific research

- Human development programs provided by Zedny organization, Cairo, Egypt (2006 - 2007)
 - Leadership
 - Mind Mapping
 - Negotiation Skills
 - Presentation Skills
 - Memory Enhancement
 - Self Learning
 - Self Planning
 - Creative Thinking
 - Time Management
 - Communication skills

References

Prof. Mahmoud Mohamed Kamal, Head of Mechanical Power Eng. Department,
Ain Shams University, 1 El-Sarayyat St. Abbasia, Cairo, Egypt
Tel: +20 100 645 1326 Email: mkamal@eng.asu.edu.eg

Prof. Ahmed Reda El-Baz, Mechanical Engineering Department, British University in Egypt (BUE),
Al Shorouk City, Egypt
Tel: +2 010 0154 3391, Email: ahmed.elbaz@bue.edu.eg

Prof. Alexey Burluka, Mechanical and Construction Engineering Department,
Northumbria University, Newcastle-upon-Tyne, NE7 7XA, the UK
Tel: +44 (0) 191 227 3754, Email: alexey.burluka@northumbria.ac.uk

APPENDIX

Detailed Synopsis of PhD

- The majority of my time as a research student has been occupied with the measurement of spark ignition engine combustion and analysis test data.
- The research has focused on investigating the impact of employing renewable fuels in spark ignition engine on the cycle-to-cycle variations. Particularly, ethanol and Ethyl Tert-Butyl Ether (EBTE) as alcohol-gasoline blends were employed as representatives of the renewable liquid fuel. In addition, a synthetic gas mixture of hydrogen and carbon monoxide was also employed as a representative of the renewable gaseous fuel.
- Experimental work included visualisation of the combustion event in a well-controlled single-cylinder optical research engine and in a well-controlled constant volume optical combustion vessel using both natural light and schlieren photography techniques.
- The study included also characterisation of the turbulent flow field within the engine cylinder using simultaneous Particle Image Velocimetry measurements (PIV) and Laser Doppler Velocimetry (LDV) techniques.
- The execution of the experiments has involved using LabVIEW for data capturing and post-processing software using Matlab.
- A very large number of tests were performed to achieve statistically acceptable estimation of the turbulent parameters and the burning rates of different fuels. These tests required consistency in experimental setup and results processing. Therefore, a number of Matlab automated batch processing tools were developed and improved to shorten the time consumed in data processing.
- The ability to reduce large amounts of raw data to usable information was essential given the amount of data generated by a single test run. Good analytical skills and the ability to manipulate and interpret information were crucial.
- Finding solutions to a lot of problems arising when simultaneously using integrated systems associated with contradictory requisites required me to apply my engineering knowledge and combine it with information from other sources proving my problem solving ability in the frame of auditing concept.