Curriculum Vitae

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Personal data

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Education

Jan. 2019- Aug. 2023
- **Ph.D.** in Mechanical Engineering, School of Mechanical and Aerospace, **Nanyang Technological University** and **ARTC-A*STAR**, Singapore.
  - Thesis: "Multi-scale and multiphase modeling of abrasive flow machining process with experimental validation."
  - Degree (CGPA) is 3.92 out of 5.

Jul. 2010- Oct. 2017
- **M.Sc.** in Mechanical design and production Engineering, **Assiut University**, Egypt.
  - Thesis: "Enhancing the surface roughness of fused deposition modeling products by hot air jet"
  - Degree is Excellent.

Jul. 2004- Jul. 2009
- **B.Sc.** in Mechanical design and production Engineering, **Assiut University**, Egypt.
  - Thesis: design and manufacture of an aluminum foam production line.
  - Degree (cumulative Average) is 84.74/100 - very good with honor's degree.

Work experience

I. Industry

Experience	Company	Task	Level
Mechanical Design and manufacturing	personal projects – Egypt	° Design and manufacturing of a desktop lathe, milling machine, disk cutting, and a compressor unit. ° Design a small CNC machine, then some work toward manufacturing.	Expert

	ITTU office - Assiut University, Egypt	Design of a RO (Reverse Osmosis) filter production machine for water desalination.	
Manufacturing processes	Drip.AI, Singapore	Responsibility for the schematic, selection, ordering, installation, and testing of a manufacturing workshop (11 machines) for cutting, shaping, and welding processes.	Expert
	NTU, Singapore	Design, manufacture, assemble, and test a small-scale Abrasive flow machine.	
	ARTC- A*STAR, Singapore.	Interning at the center for 4 years as part of a Ph.D. study in the abrasive flow machining process.	
Process control	Abu Robocon competition, Egypt.	Design robots for the appointed tasks. This includes the design, manufacturing, and control of it.	advanced
Additive manufacturing-FDM	Assiut University, Egypt.	Design, manufacturing, and assembly of a hot air pumping system (up to 350 ℃) as part of an improvement to fused deposition modeling (3D-printing) technology.	Expert
Industrial burners	Assiut University, Egypt.	Design and construction of an industrial furnace for glass cups.	Expert
	Assiut University, Egypt.	Design and construction of a one-ton Aluminum foam furnace.	
	personal project, Egypt.	Design, built, and marketing of an industrial burner and its controller optimized for Natural gas furnace application.	
Modeling and Simulation	Assiut University, Egypt.	Ansys structure course with tutorials.	advanced
	ARTC-A*STAR and NTU, Singapore.	CFD simulation of flow inside pipes by ANSYS-FLUENT. Abrasive action simulation by Molecular dynamics (DEM)	
Miscellaneous	The mechanical and electrical system of Pumps in Elwady ELgedeed.	Inter in the company for the following tasks: internal combustion engine maintenance and underground water pump installation.	Fair
	Osman Ahmed Osman.	Training in hydraulic system maintenance for loaders.	

II. Research (R&D)

- Postgraduate researcher (Ph.D. Jan. 2019- Aug. 2023)
  - ° Multiscale modeling and simulation of the Abrasive flow machining process, and Conversant with the process details.
  - ° Implementing ANSYS-FLUENT to simulate and study the flow of a viscoelastic fluid inside channels with a slip velocity.

- Implementing atomistic simulation (Molecular dynamics by LAMMPS) to simulate micro-cutting processes; a typical example is Abrasive action in the abrasive flow machining process.
- Design and manufacture of a small-scale abrasive flow machine to test the process experimentally on the microscale.

- Postgraduate researcher (M.Sc. Dec. 2010- Oct. 2017)
  - Developed a novel hot air system (up to 350 ℃) for polishing/smoothening and improving interlayer bond strength, which is optimized for plastic additive manufacturing products.
  - Conversant with the smoothening methods of plastic-based additive manufacturing products.
  - Experienced with Fused deposition technology and its use, machine, and research problem and quite experienced with selective laser sintering technology.
  - Developed an analytical heat transfer model for the developed polishing process.

III. Academia (teaching)

Position	University	Task
Demonstrator (Dec.2010- Dec.2017)	Assiut University, Egypt	Tutor, mentor, foreman, and marker for students scale from 10 to 70 in the below courses.
Assistant Lecturer (Dec.2017- Dec.2018)	Assiut University, Egypt	Senior tutor, mentor, foreman, and marker for students scale from 10 to 70 in the below courses.
Mentor (Aug. 2020- Jun. 2021)	NTU, Singapore	Mentor of two final year projects under my Ph.D. topic for students ranging from 1-3.
Lecturer (Assistant Prof.) (Dec.2023- Present)	Assiut University, Egypt	• Lecturer, examiner, and marker in undergraduate and postgraduate courses for students ranging from 1 to 30 in the following courses. • Administrative tasks regarding management, university, and community service.

The courses I have been lecturer/tutor on them are:

Lecturer:

- Machine Design 2
- Metal forming
- Die design
- Machine tool design
- Casting and welding

Tutor:

- Engineering drawing
- Production engineering
- Machine Design 1,2
- Metrology
- Metal forming
- Machine tool design
- Stress analysis
- Design and production Laboratories 1,2
- Machine Drawing and Construction
- Modeling of Dynamic Control Systems
- Die design
- Design of industrial furnace

IV. Administrative tasks

- Mentor and supervisor for Assiut University Workshops (May 2023- present)
- Supervisor of a Ph.D. student (2024- present)

Publications

Journal paper:

[1] **M. Adel**, O. Abdelaal, A. Gad, A. B. Nasr, and A. Khalil, "Polishing of fused deposition modeling products by hot air jet: Evaluation of surface roughness," **J. Mater. Process. Technol.**, vol. 251, May 2017, pp. 73–82, 2017.

[2] **M. Adel**, Osama, Abdelrasoul, Abu Bakr, Aboel Makaram "ENHANCING THE SURFACE ROUGHNESS OF FUSED DEPOSITION MODELING PRODUCTS", **Journal of Engineering Sciences**, Vol. 37, No. 4, PP.925-942, Assiut University, July 2017.

[3] M. Heshmat and **M. Adel**, "Investigating the effect of hot air polishing parameters on surface roughness of fused deposition modeling PLA products: ANOVA and regression analysis," **Prog. Addit. Manuf.**, vol. 6, no. 4, pp. 679–687, 2021, doi: 10.1007/s40964-021-00190-6.

Thesis:

[1] **M. Adel**, H. Li, and W. Chow Cher, "Multi-scale and multiphase modeling of abrasive flow machining process with experimental validation," **Nanyang Technological University**, 2023. doi: 10.32657/10356/169891.

Conference paper:

M. Adel, Abu Bakr, Aboel Makaram, "A Model Of New Polishing Process to Fused Deposition Modeling Parts", proceeding of 1st ICCEEE, May 2017, Alexandria-Egypt.

Funding obtained

- I was awarded a fund for my research in M.Sc. degree with details:

Funding Agency	Grant type	Funding amount	Year	Role	Funding duration
Science and Technology Development Fund; STDF	research support-grant ID #12612	L.E. 100,00 (US$ 14,000)	2014	Co-PI	3 years

Awards and academic achievements

- **SINGA offer in 2018** (Singapore International Graduate Award) to conduct Ph.D. studies at Nanyang Technological University as part of A*STAR-NTU cooperation.

- **Assiut University offer in 2010** for employment as a demonstrator and to conduct M.Sc. studies. This offer is only available to top-ranked students; I am the **third-ranked graduate student** in the Mechanical Department in 2009.
- **The 3rd ranked team award in 2009** to our team (4 persons) with 10,000 LE (US$ 2000) in the "Abu Robocon - Egypt" competition (for robot design**)** which was held between different Egyptian universities in 2009**.**
- **Special judgment-committee award in 2008** to our team in the "Abu Robocon - Egypt" competition.
- **Academic excellence awards** in academic years **2005/2006 and 2006/2008** in form of a financial award of 100 EGP (25 US$). This award is given to undergrad students with DISTINCTION in their cumulative grade per year.

Software skills

- Solidworks
- Catia (little)
- ANSYS-FLUENT
- Fortran
- LAMMPS
- Microcontroller programming (Microchip, Atmel)
- Cura- 3D printing
- Multisim-
- Eagle – PCB board
- Mach3- CNC
- Arduino
- PLC programming (LG, Siemens)
- MS Office
- C (moderate)
- Python – ML (moderate)
- Camtasia Studio.
- Ovito

Languages

Arabic: mother tongue
English: Average

Reference

1- **Li Hua (Ph.D supervisor)**
Address: Associate Professor, School of Mechanical and Aerospace Engineering, Nanyang Technological University, Singapore.
page: http://mae.ntu.edu.sg/aboutus/FacultyandStaff/Faculty/Pages/lihua.aspx
E-mail: lihua@ntu.edu.sg

2- **Wong Chow Cher (Ph.D co-supervisor)**
Address: Business Development Director, Advanced Remanufacturing and Technology Center (ARTC), of the Agency for Science, Technology and Research (A*STAR), Singapore.
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page: https://www.a-star.edu.sg/artc/about-artc/management

3- **Ibrahim Mohamed Hassaballah (M.Sc. examination Committee)**
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4- **Othman Hassan Othman (Job leader and friend)**

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