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Appointments

August 2020-Present School of Engineering - Liverpool John Moores University
Postdoctoral Research Associate
PI: Dr. Mehdi Seddighi & CoI: Dr. Charles Moulinec (STFC Laboratories)

July 2020-Present Mechanical Power & Aerospace Engineering - Mansoura University
Lecturer/Assistant Professor (on leave)

June 2018 - August 2020 School of Engineering - University of Liverpool
Research Associate
PI: Prof. Robert Poole

Education

2015-2019 PhD in Mechanical Engineering - University of Liverpool

Thesis title - 'Influence of Fluid-Structure Interaction on Human Eye Biomechanics Under Air Puff Non-Contact Tonometry'
Advisors: Prof. Ahmed Elsheikh & Prof. Vassilis Theofilis

2013-2014 PreMSc in Mechanical Power Engineering - Mansoura University

First Class with honors
Research title - 'Flow in Microchannels and Applications in Nano-Technology Industry'

2008-2013 BSc (Hons) in Mechanical Power Engineering - Mansoura University

First Class with honors, GPA: 88.76%, Ranked: 3/189
Final Year Project -'Design of Natural Gas transportation pipeline'

Teaching

Jan 2018 - Dec 2018 University of Liverpool-Higher Education Academy
Teaching for Researchers leading to AFHEA

- EDEV306: The value of learning theory - The nature of good teaching in HE - Supervising students - Teaching large groups
- EDEV307: Introducing assessment - Planning assessment and marking students - Feedback on assessment - Academic integrity in assessment

Sep 2015 - May 2018 School of Engineering - University of Liverpool
Graduate teaching assistant

- Lab demonstrations: Friction in pipes (FPL) - Hydraulic Jump (HJ), Heat Pump/Refrigeration (HPR)
- Thermodynamics (ENGG109)- Fluid mechanics (ENGG109)- Solids and structures (ENGG110) problem solving tutorials
- Advanced Fluid Mechanics (ENGG419): 3 Lectures cover, and tutorials on MATLAB, Gmsh, and OpenFoam

Nov 2015 - May 2018 Liverpool International College (LIC) – University of Liverpool
Science and Engineering Lecturer

- Engineering (FC023), Mathematics (FC091), Statistics (FC040) and Physics (FC021) foundation teaching
- Statistics (PM011) premaster teaching
- Physics and Engineering lab demonstrations, module development and Engineering design project supervision

Jan 2014 - April 2015 Faculty of engineering - Mansoura University
Graduate teaching assistant

Teaching fluid mechanics, thermodynamics, engineering drawing, measurements and numerical analysis with MATLAB - lab experiments - regulating exams.

Key Research Experience

August 2020- Present School of Engineering - Liverpool John Moores University
Mechanical Engineering and Materials Research Centre (MEMARC)

- Development of a novel approach in modelling turbulent pulsating flows
- Code developing of a high-fidelity, high-scalability, in-house CFD (Computational Fluid Dynamics) package using DNS (direct numerical simulations) and LES (large eddy simulations)
- Investigation of the detailed flow structures and turbulence statistics for pulsating flows
- Pulsatile blood flows in arteries, will be analysed against experimental data

June 2018 - August 2020 School of Engineering - University of Liverpool
Fluids Engineering Research Group

- Elastic turbulence and its role in enhancing mixing and heat transfer in serpentine channels
- Rheological characterisation of functionalised dipeptide solutions to measure their extensional and elastic properties through CaBER and normal stress differences
- Experiments on slender-body theory in viscoplastic fluids which is a direct application of understanding the locomotion and propulsion of micro-organisms in biofluids and bacteria-inspired microrobots

May 2015 - April 2019 School of Engineering - University of Liverpool
Biomechanical Engineering Group

- Fluid Structure Interaction (FSI) simulation of the human eye under the air puff non-contact tonometry for corneal material characterisation
- Medical devices development for accurate intraocular pressure measurement
- Corneal surgical planning

2 April - 8 April 2017 European Research Community On Flow Turbulence and Combustion (ERCOFTAC)
Montestigliano Spring School - Italy

- Introduction on the essentials of sound generation and propagation, the numerical techniques required to simulate sound and sound control strategies, including adjoint and reduced order model-based approaches
- Functional and Fmin search optimization, reflecting and non-reflecting boundaries
- Lagrange multipliers

23 Oct - 27 Oct 2017 Linné FLOW Centre, KTH - Royal Institute of Technology - Stockholm
FLOW Autumn School on Aeroacoustics and Thermoacoustics of Propulsion Systems

- Turbomachinery aeroacoustics' principles to develop suitable experimental, numerical, and modeling strategies to understand, accurately predict, and eventually suppress the source of the noise associated with propulsion systems
- Modeling and suppressing thermoacoustic instabilities in gas turbine combustors
- Fundamentals of subsonic and supersonic jet noise modeling and control with and without fluid-structure interaction

Publications

1. Eliasy A, Chen KJ, Vinciguerra R, **Maklad O**, et al. Ex-vivo experimental validation of biomechanically-corrected intraocular pressure measurements on human eyes using the CorVis ST. Exp Eye Res. (2018);175:98-102. (doi:10.1016/j.exer.2018.06.013)

2. **Maklad O**, Theofilis V, Elsheikh A. Fluid Structure Interaction (FSI) Simulation of the human eye under the air puff tonometry using Computational Fluid Dynamics (CFD). ICCFD10, Barcelona; (2018). http://www.iccfd.org/iccfd10/proceedings.html. (**Conference paper**)

3. **Maklad O**, Theofilis V, Elsheikh A. Role of impinging jets in the biomechanical correction of the intraocular pressure (IOP) measurement. ICFD13, Cairo; (2018): ICFD13-EG-6095. http://icfd-egypt.com/ICFD13_2018.html. (**Conference paper**)

4. **Maklad O**. Influence of fluid-structure interaction on human eye biomechanics under air puff non-contact tonometry. (July-2019). (EThOS ID: uk.bl.ethos.778526) (**Ph.D. Thesis**)

5. **Maklad O**, Eliasy A, Chen K-J, Theofilis V, Elsheikh A. Simulation of Air Puff Tonometry Test Using Arbitrary Lagrangian–Eulerian (ALE) Deforming Mesh for Corneal Material Characterisation. International Journal of Environmental Research and Public Health. (2020); 17(1):54. (doi:10.3390/ijerph17010054)

6. McAulay K, Ucha PA, Wang H, Fuentes-Caparrós AM, Thomson L, **Maklad O**, Khunti N, Cowieson N, Wallace M, Cui H, Poole RJ. Controlling the properties of the micellar and gel phase by varying the counterion in functionalised-dipeptide systems. Chemical Communications. (2020);56(29):4094-7. (doi: 10.1039/d0cc01252a)

7. **Maklad O**, Eliasy A, Chen K-J, Wang J, Abass A, Lopes BT, Theofilis V and Elsheikh A. Fluid-structure interaction based algorithms for IOP and corneal material behaviour. Frontiers in bioengineering and biotechnology (2020) 8:970. (doi: 10.3389/fbioe.2020.00970)

8. Doll T, Moore J, Shihab AH, Lopes BT, Eliasy A, **Maklad O**, et al. Which feature influences on-eye power change of soft toric contact lenses: Design or corneal shape? PLoS ONE, (2020), 15(11): e0242243. (doi:10.1371/journal.pone.0242243)

9. **Maklad, O.**, and R. J. Poole. "A review of the second normal-stress difference; its importance in various flows, measurement techniques, results for various complex fluids, and theoretical predictions." Journal of Non-Newtonian Fluid Mechanics (2021): 104522. (doi:10.1016/j.jnnfm.2021.104522)

10. Lace, R., Duffy, G.L., Gallagher, A.G., Doherty, K.G., **Maklad, O.**, Wellings, D.A. and Williams, R.L. Characterization of Tunable Poly-ϵ-Lysine-Based Hydrogels for Corneal Tissue Engineering. Macromolecular bioscience, (2021), p.2100036. (doi:10.1002/mabi.202100036)

Pastoral Care Roles

- Senior Residential Advisor, Carnatic Halls, Tudor Close , and Crown Place (2015-2021)
- Volunteered to help a disabled student over 2 semesters in (2017/2018) when the school disability officer asked for volunteers. The help was on Aeroengines (AERO213), Thermodynamics (MECH217), and Solid Mechanics (MECH307)

Awards

- Best paper award-Thirteenth International Conference of Fluid Dynamics-ICFD13 (2018)
- Staff innovation and success award from Liverpool International College (2017)
- Best PhD poster in the University of Liverpool poster conference (2016)
- University of Liverpool PhD scholarship (2015)

Professional Bodies

- (HEA) Higher Education Academy - Associate Fellow (AFHEA) ID: PR162016 (2019)
- (AIAA) American Institute of Aeronautics and Astronautics - Member ID: 605838 (2019)
- (BSR) British Society of Rheology - ID: 804362 (2019)
- (ASME) American Society of Mechanical Engineers - ID: 102861010 (2019)
- (IMechE) Institution of Mechanical Engineers - IEng MIMechE ID: 80361862 (2018)
- (EES) Egyptian Engineers Syndicate - Membership ID: 70/05653 (2013)

Training courses

- Message-passing programming with MPI - Provided by (EPCC) (March 2021)
- Introduction to ARCHER2 for software developers - Provided by (EPCC) (Jan 2021)
- Advanced Electron Microscopy Of Materials Structures And Processes- Mats403 at UoL (2019)
- Hands-on training from Natural Instruments (NI) on HIL, TestStand and PXI instrumentation (2017)
- Managing Safety at University of Liverpool (2017)
- Laser safety training (2017)
- Keeping Healthy, Safe and Well at UoL (2017)
- Bribery Act 2010 (2017)
- University Induction (2016)
- Departmental Induction (2016)
- Data Protection Act (2016)
- Information Security (2016)
- Introduction to Diversity and Equality (2016)
- Mansoura University Nano Technology Center Training (2014)
- Gasco company training during graduation project (2013)
- Talkha Power Station training course (2012)
- Air conditioning, Fire Fighting & Plumbing (2012)
- PLC (2011), AutoCAD(2011), hydraulic circuits, electro pneumatic control (2012), Solid works(2013)
- Suez Canal Authority shipyard training(2010)
- Misr Italy company maintenance training(2009)

Software Engineering Skills

Programming Languages
Fortran
C++
MATLAB
Python
Latex

Simulation & CAD
Ansys
Abaqus
CHAPSim
Simscale
OpenFoam
SolidWorks
Creo

HPC skills
Linux
Barkla & ARCHER2 cluster proficiency
Message-passing programming with MPI
Co-simulation for multi physics

Referees

Name Prof. Rob Poole
Workplace University of Liverpool
Position Harrison Chair in Mechanical Engineering
Contact Robpoole@liverpool.ac.uk

Name Prof. Vassilis Theofilis
Workplace University of Liverpool
Position Chair in Aerospace Engineering
Contact V.Theofilis@liverpool.ac.uk

Name Prof. Ahmed Elsheikh
Workplace University of Liverpool
Position Professor of Biomaterial Mechanics
Contact Elsheikh@liverpool.ac.uk

Name Dr. Mehdi Seddighi
Workplace Liverpool John Moores University
Position Reader in Fluid Mechanics
Contact M.Seddighi@ljmu.ac.uk

Last updated: November 8^{th}, 2021