Omar Elnaggar

Researcher · Educator · Engineer · Entrepreneur

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Ⓦ Website | 🔗 LinkedIn

SUMMARY

A doctoral researcher with an avid interest in smart healthcare and machine learning, and pursuing a personal passion for teaching and learning. Aspired to a career where research and teaching meet at one sweet spot, and where I can demonstrate my growing management and entrepreneurial skills.

EDUCATION

Doctor of Philosophy in Mechanical, Materials and Aerospace Engineering   *2019 - Present*

UNIVERSITY OF LIVERPOOL

• Dissertation title: WEARABLE SENSING FOR NON-INVASIVE HUMAN POSE AND MOVEMENT ANALYSIS DURING SLEEP

• In collaboration with an orthopaedic consultant at Liverpool University Hospitals NHS Foundation Trust.

Master of Engineering in Mechatronic Engineering   *2015-2019*

UNIVERSITY OF NOTTINGHAM

• Best student award - rank 1/80

• First Class with Honours

• Dissertation title: VOLITIONAL CONTROL OF UPPER LIMB PROSTHESIS FOR REHABILITATION SERVICES

International Baccalaureate Diploma   *2013-2015*

AL-WAKRA INDEPENDENT SECONDARY SCHOOL FOR BOYS

• Ranked among the top 2% worldwide

Qatari High School Certificate   *2013-2015*

AL-WAKRA INDEPENDENT SECONDARY SCHOOL FOR BOYS

• Overall mark: 97%

MEMBERSHIPS

The Higher Education Academy (Advance HE)   *2023 - Present*

ASSOCIATE FELLOW

Institute of Electrical and Electronics Engineers   *2019 - Present*

MEMBER

AWARDS AND ACHIEVEMENTS

Winner of the "Build your own business 3" Pitch Contest (aka Launch £10,000 Programme)   *2021*

University College London

EPSRC Funded PhD Studentship   *2019*

University of Liverpool Doctoral Network in AI for Future Digital Health

Japanese Government (MEXT) Postgraduate Scholarship   *2019*

The Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Best Engineering Student Award   *2019*

IEEE Electronics Packaging Society Malaysia Chapter

Best Engineering Undergraduate Final Year Project - Finalist   *2019*

The Institution of Engineering and Technology (UK) and The Institution of Engineering (Malaysia)

Best Student in MEng in Mechatronic Engineering (Year 3) Award   *2017-2018*

The University of Nottingham

Greenbulb Energy Prize for Outstanding Performance: Control Systems Design   *2017-2018*

The University of Nottingham and Greenbulb Energy Pte. Ltd.

Dean's Excellence Scholarship Award   *2017-2018*
  The University of Nottingham

Department Undergraduate Development Scheme   *2018*
  The University of Nottingham

Certificate of Recognition: Mechatronic Engineering Course Representative   *2018*
  The University of Nottingham

Certificate of Recognition: Mechatronic Engineering Course Representative   *2019*
  The University of Nottingham

Department Undergraduate Development Scheme   *2016*
  The University of Nottingham

Freescale Cup Intelligent Car Competition - Finalist   *2016*
  NXP Semiconductors

High Achievers Scholarship Award   *2015-2016*
  The University of Nottingham

Government Excellence Sponsorship   *2013-2015*
  Ministry of Education and Higher Education Qatar

Certificate of Excellence   *2014*
  Al-Wakra Independent Secondary School for Boys

French Language DELF A1 Proficiency Exam - Top Scorers Award   *2014*
  The French Council (Qatar)

Certificate of Excellence   *2013*
  Al-Wakra Independent Secondary School for Boys

RESEARCH FUNDING

Studentainment - Game-based Virtual Laboratories for Engineering Higher Education

Funding Body: University of Sheffield

Date Advised Funding was Secured: Mar 2022

Project Start Date: Sep 2022

Length of Project: 1.25 years (ends Dec 2023)

Grant Total: £7,698

Involvement: Co-Investigator

Other Investigators: Roselina Arelhi

Foot-ZZ - Clinical validation of a novel wearable sensor network for in-bed postural analysis

Funding Body: British Orthopaedic Foot and Ankle Society

Date Advised Funding was Secured: Sep 2022

Project Start Date: Jan 2023

Length of Project: 3 years (ends Dec 2026)

Grant Total: £15,000

Involvement: Co-Investigator

Other Investigators: Lyndon Mason and Paolo Paoletti

RESEARCH PUBLICATIONS

O. Elnaggar, A. Hopkinson, F. Coenen, and P. Paoletti, *Sensor-enabled Sleep Posture Analysis: State-of-the-art and Opportunities of Wearable Technologies from Clinical, Sensing and Intelligent Perception Perspectives*, Biomedical Robots and Devices in Healthcare: Opportunities and Challenges for Future Applications, 2024. [Book chapter under second peer review by Elsevier]

O. Elnaggar, F. Coenen, A. Hopkinson, L. Mason, and P. Paoletti, *Sleep Posture One-Shot Learning Framework based on Extremity Joint Kinematics: In-Silico and In-Vivo Case Studies*, Information Fusion, 2023. [Link to Paper]

O. Elnaggar, R. Arelhi, F. Coenen, A. Hopkinson, L. Mason, and P. Paoletti, *KIDS: Kinematics-based (In)activity Detection and Segmentation in a Sleep Case Study*, Scientific Reports, 2023. [Link to preprint]

O. Elnaggar, F. Coenen, A. Hopkinson, L. Mason, and P. Paoletti, *Sleep Posture Classification: From In-Silico Proof-of-concept to Validation with Wearable Sensors*, Insigneo Showcase, United Kingdom, 2022. [Link to Poster]

O. Elnaggar, F. Coenen, A. Hopkinson, and P. Paoletti, *Generalised Joint Kinematic Analysis and 3D Visualisation: A Human Wrist Case Study*, BioMedEng22 Conference, United Kingdom, 2022. [Link to Abstract]

O. Elnaggar, F. Coenen, A. Hopkinson, and P. Paoletti, *Perception of Sleeping Poses Using Extremity Limb Orientations*, BioMedEng21 Conference Proceedings, United Kingdom, 2021. [Link to Abstract]

O. Elnaggar, F. Coenen, and P. Paoletti, *In-Bed Human Pose Classification Using Sparse Inertial Signals*, 40th International Conference on Innovative Techniques and Applications of Artificial Intelligence, Springer, Cham, 2020. [Link to Paper]

O. Elnaggar, F. Coenen, and P. Paoletti, *Wearable Sensing For Non-invasive Human Pose Recognition During Sleep*, AI for Future Digital Health Workshop, SGAI 40th International Conference on Artificial Intelligence, 2020. [Link to Video]

O. Elnaggar, and R. Arelhi, *A New Unsupervised Short-Utterance based Speaker Identification Approach with Parametric t-SNE Dimensionality Reduction*, International Conference on Artificial Intelligence in Information and Communication (ICAIIC), Japan, 2019. [Link to Paper]

O. Elnaggar, and R. Arelhi, *An Unsupervised Speaker Identification Approach: A Breakthrough 3D Visualization of High Dimensional Features*, 21st International Conference on Artificial Intelligence and Pattern Recognition (ICAIPR), Singapore, 2019. [Link to Paper]

TEACHING PUBLICATIONS

O. Elnaggar, and R. Arelhi, *Game-based Learning in Engineering Education: How can we reconcile seemingly conflicting interests of students, academics, universities and national policy makers?*, BERA (British Educational Research Association) Conference, United Kingdom, 2022. [*accepted*]

O. Elnaggar, and R. Arelhi, *Design and Development of Game-based Learning for Virtual Engineering Laboratories: Two Case Studies*, AdvanceHE Teaching and Learning Conference, United Kingdom, 2022. [*accepted*]

O. Elnaggar, and R. Arelhi, *Quantification of Knowledge Exchange Within Classrooms: An AI-based Approach*, 9th European Conference on Education, United Kingdom, 2021. [Link to Paper]

EMPLOYMENT HISTORY

The University of Sheffield　　　　　　　　　　　　　　　*03/2022 - Present | England*

Independent Consultant - Educational Technology

• Initiated and led the development of new instructional technologies for engineering laboratories.

• Delivered tools to support student learning experience, such as digital Game-based Learning and animations.

• Designed appropriate criteria for automated assessment of students' work and provision of quality feedback.

Contact: *Dr. Roselina Arelhi - R.Arelhi@sheffield.ac.uk*

VirLaber Ltd　　　　　　　　　　　　　　　　　　　　*08/2021 - Present | Dubai*

Founder and Chief Technology Officer

• Established collaborations with academics in and out of UK to help them improve their quality of teaching.

• Led the development of a number of virtual labs for Engineering and Computer Science modules.

• Won a national judged pitching contest in the UK.

Mindset Spinoff　　　　　　　　　　　　　　　　　　*08/2021 - Present | England*

Content Creation Director (Project Initiative)

• Recruited a team of talented professionals in the field of Media Production.

• Managed the production of creative digital content on education and self-development topics.

The University of Sheffield *01/2021 - 09/2021 | England*
Graduate Research Assistant

- Joined a university-wide research project on the curriculum design and delivery of engineering programmes.
- Proposed a novel pedagogical framework to stimulate student-to-student interaction and knowledge exchange.
- Employed machine learning to assess, qualitatively and quantitatively, the efficacy of pedagogical frameworks.
- Supervised a team of four interns to design and incorporate Game-based Learning in Engineering Education.
- Published and presented first-authored papers at leading teaching and learning conferences.

Contact: *Dr. Roselina Arelhi - R.Arelhi@sheffield.ac.uk*

The University of Liverpool *09/2020 - Present | England*
Graduate Teaching Assistant

- Taught undergraduates in four programmes: mechanical, aerospace, mechatronics and civil engineering.
- Delivered both face-to-face and online teaching sessions.
- Demonstrated practical sessions for engineering modules (nearly 40 laboratory sessions a year).
- Marked students' work using published assessment criteria and provided them with feedback on their progress.

Contact: *Dr. Riaz Akhtar - R.Akhtar@liverpool.ac.uk*

Intel Corp *06/2017 - 09/2017 | Malaysia*
Static Timing Analyst (Intern)

- Performed full chip timing execution tasks.
- Debugged several issues in the result and flow.
- Developed scripts to automate many of the computationally intensive tasks.

Contact: *Mr. Ashish Goel - ashish.kumar.goel@intel.com*

Motorola Solutions Inc & The University of Nottingham *06/2016 - 08/2016 | Malaysia*
Control Systems Engineer (Trainee)

- Designed and produced a fully functional Anti-lock Braking System (ABS) for automobiles.
- Tested the system in various real driving scenarios.

Contact: *Dr. Kevin Lee -* [in] *LinkedIn Profile*

TECHNICAL SKILLS

ARTIFICIAL INTELLIGENCE	Data Augmentation | Data Analytics | Natural Language Processing | Deep Learning
PROGRAMMING	C/C++/C# | MATLAB & SIMULINK | Python | TensorFlow & PyTorch | HTML & CSS
EMBEDDED SYSTEMS	Wearable Sensors | (Mixed-signal) PCB Design | Sensor Fusion Algorithms
SOFTWARE DEVELOPMENT	UI/UX Design | Sequential/Parallel Processing | Web Development
COMPUTER SKILLS	Windows & Unix OS | 2D/3D CAD | Game Development (3D modelling & animation)
AUTOMATION & MANUFACTURING	Programmable Logic Controllers | Subtractive & Additive Manufacturing Processes

HIGHLIGHTED PROJECTS

Handmade Smart Socks for Activity Recognition *2022 - 2022*
UNIVERSITY OF LIVERPOOL

- Designed washable pressure-sensitive smart socks purely made of electronically active yarns (e-textile).
- Developed the socks using low-cost processes, such as handmade crochet and knitting.
- Designed and fabricated a small-sized wearable embedded system for sensor data acquisition and transmission.
- Developed an algorithm for step detection and basic activity recognition.

Design and Evaluation of Knowledge Exchange in Undergraduate Classrooms *2020 - 2021*
UNIVERSITY OF SHEFFIELD & UNIVERSITY OF LIVERPOOL

- Designed a framework for a group assignment for an engineering module, cultivating knowledge exchange.
- Produced AI-based visualisations of students' knowledge before and after taking the group coursework.
- Recommended evidence-based approaches to foster knowledge exchange in classrooms.

Wearable Sensing for Non-invasive Human Pose Classification During Sleep
2019 - Present

UNIVERSITY OF LIVERPOOL

- Formulated the clinical problem in collaboration with an orthopaedic consultant at Aintree University Hospital.
- Conducted virtual sleep experiments leveraging on digital 3D animation software.
- Proposed novel algorithms for human body pose tracking during sleep.
- Developed custom-made wearable sensors for in-bed human motion analysis.
- Invited human participants to clinical trials for validating the proposed algorithms.

Volitional Control of Upper Limb Prosthesis for Rehabilitation Services
2018 - 2019

UNIVERSITY OF NOTTINGHAM

- Developed a musculoskeletal model of the human upper limb and simulated it under dynamic movements.
- Additively manufactured a controllable biomimetic prosthetic limb.
- Applied machine learning for the decoding of non-invasive EMG signals to recognise prosthetic movements.
- Implemented a closed-loop feedback control system to regulate the prosthetic movements.

Speaker Recognition Using Short Incoherent Speech for Health Emergencies
2017 - 2018

UNIVERSITY OF NOTTINGHAM

- Proposed a novel short-utterance speaker identification algorithm using parametric dimensionality reduction.
- Published two papers as first author during the third year of the MEng degree.

LANGUAGES

Arabic	English	French
Native Proficiency	Full Working Proficiency	Basic

INVITED TALKS

Guest Lecture: Sensors and Perception in Robotics
02/2022

University of Sheffield

- Presented the different types of robot sensors: proprioceptive, exteroceptive, passive and active sensors.
- Presented common actuator options in robotics: electrical, pneumatic, hydraulic and soft actuators.
- Discussed uncertainty of sensor measurements, sensor fusion techniques, and Bayesian decision making.
- Provided students with an overview of the legal and ethical implications of robotics.

Guest Speaker: Engineering Employability Week
03/2021

University of Liverpool

- Shared my experience as a PhD student and presented post-PhD career pathways.

Guest Lecture: Stochastic Processes
12/2020

University of Sheffield

- Lectured a class of 120 undergraduate students on the probability theory behind stochastic processes.

Guest Speaker: Final Year Project Sharing
11/2018

University of Nottingham

- Gave an eye-opening talk to undergraduate engineering students on the applications of AI in signal processing.
- Shared tips on how to ace the final year project.

EXTRA-CURRICULAR ACTIVITIES

Elsevier Advisory Panel Member
2023-present

ELSEVIER PUBLISHING COMPANY LTD

- Provided feedback and suggestions for improvement of Elsevier's products & services.
- Conducted testing of and assessed Elsevier's newest tools and products against the needs of peer researchers.

Academics Across The Globe Initiative   *2020-present*
UNIVERSITY OF LIVERPOOL & UNIVERSITY OF NOTTINGHAM

• Founded an online LinkedIn group which brings together academics and early-career researchers.

• Co-administer the group to assist members in navigating their career pathways, and forming collaborations.

University-wide Green Initiative   *04/2021-10/2021*
UNIVERSITY OF LIVERPOOL

• Designed, built and installed vertical hydroponic systems around the campus to push the sustainability agenda.

Specialised Virtual Engineering Labs   *2020-present*
UNIVERSITY COLLEGE LONDON, UNIVERSITY OF SHEFFIELD & UNIVERSITY OF LIVERPOOL

• Took the initiative to address the lack of well-established digital platforms for engineering practicals.

• Formed a team of developers with expertise in immersive digital environments.

• Capitalised on game development and gamification to create virtual labs for a better learning experience.

• Received positive feedback from academics at The University of Nottingham and The University of Sheffield.

Entrepreneurship Course: Build your own business 3   *07/2021 - 08/2021*
UNIVERSITY COLLEGE LONDON

• Won a pitch contest alongside other London students and graduates.

• Realised the process of launching a business through interactive workshops and one-to-one mentoring support.

• Grasped the different aspects of Intellectual Property, legal matters and startup financing.

Entrepreneurship Course: Build your own business 2   *05/2021 - 06/2021*
UNIVERSITY COLLEGE LONDON

• Recognised the tools needed to test the viability of a business idea and develop a business plan.

• Learnt the principles of identifying potential markets and target customer segments.

Self-learning: System Identification and Parameter Estimation   *2018*
DELFT UNIVERSITY OF TECHNOLOGY

Self-learning: Bio Mechatronics   *2018*
DELFT UNIVERSITY OF TECHNOLOGY

Intern Training Course Package   *2017*
INTEL

• Privacy Essentials.

• Data Leaks Avoidance.

• Information Security Awareness.

• Export Compliance Written Assurance.

edX Course: Introduction to C++   *2016*
MICROSOFT CORPORATION

CS4 Qatar for Robotics   *2015*
CARNEGIE MELLON UNIVERSITY

First Aid Training   *2015*
QATAR CENTRE FOR VOLUNTARY ACTIVITIES

Debate Course   *2014*
GEORGETOWN UNIVERSITY

Organising Committee Member for the Following Events:
ROBOTICS SOCIETY, THE UNIVERSITY OF NOTTINGHAM

• Arduino workshops for undergraduate students, *2015*

THE YOUTH COMPANY, QATAR

• "*Run the World*" Festival, *2014*

MINISTRY OF CULTURE AND SPORTS, QATAR

• Qatar's Sports Day, *2014*

AL-WAKRA INDEPENDENT SECONDARY SCHOOL FOR BOYS, QATAR

• UK Universities Exhibition, *2014*

QATAR CENTRE FOR VOLUNTARY ACTIVITIES

• Volunteer's International Day, *2014*

Participant in the Following Activities:

INTEL

• Intel Cycling Ride (Silver Medal), *2017*

THE UNIVERSITY OF NOTTINGHAM

• Life Cycle Malaysia 3 (20-Km Charity Ride), *2016*

QATAR FOUNDATION & THE THIMUN FOUNDATION

• Model United Nations (THIMUN), *2015*

AL-WAKRA INDEPENDENT SECONDARY SCHOOL FOR BOYS, QATAR

• School's Scout Team (camping, desert greening, etc.), *2013-2015*

QATAR KARATE FEDERATION

• Qatar's Karate Cup (Silver Medal), *2013*

REFERENCES

Dr Roselina Arelhi
Director of Learning and Teaching

Department of Automatic Control and Systems Engineering

Faculty of Engineering

The University of Sheffield

Mappin Street

Sheffield S1 3JD

United Kingdom

Telephone: +44 (0) 114 2225136

E-mail: R.Arelhi@sheffield.ac.uk

Dr Paolo Paoletti
Senior Lecturer

Department of Mechanical, Materials and Aerospace Engineering

School of Engineering

The University of Liverpool

Brownlow Hill

Liverpool L69 3GH

United Kingdom

Telephone: +44 (0) 151 7945232

E-mail: P.Paoletti@liverpool.ac.uk

Prof Frans Coenen
Professor

Department of Computer Science

School of Electrical Engineering, Electronics and Computer Science

The University of Liverpool

Ashton Building, Ashton Street

Liverpool L69 3BX

United Kingdom

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