Khalil Al Handawi

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Profile

Research	Design under uncertainty, remanufacturing, multidisciplinary design optimization
Technical	Numerical simulation, optimization, statistical modeling, machine learning
Software	MATLAB/Simulink, Python, C++, R, mySQL, Abaqus, NX Siemens

Experience

Computer Science and Operations Research, Université de Montréal — Montréal, Canada

May 2022 – present *Postdoctoral Researcher*

- Analyze IATA data involving **25M flight schedules** using graph representation learning.
- Develop community detection algorithms for graphs with over **10K nodes** and **100K edges**.

Deparment of Mechanical Engineering, McGill University — Montréal, Canada

Sep 2022 – Dec 2022 *Adjunct Lecturer*

- Was the sole instructor of the Engineering Systems Optimization course (MECH559).
- Developed Python notebooks as teaching aids for the students to understand the implementation of modern optimization algorithms and recieved an engagment rate of **70%** with the students.

Jan 2021 – Apr 2022 *Postdoctoral Researcher*

- Developed a hyperparameter optimization framework for machine learning based on direct search.
- Developed deep learning COVID-19 forecasting models with **7-day** forecast window and an accuracy of $\pm$**50 daily cases**.
- Developed a mechanistic COVID-19 model with GPU acceleration with a **1000X** performance enhancment relative to state-of-the-art epidemic simulators.

Jan 2017 – Jan 2021 *Research assistant*

- Developed mathematical frameworks and software for design space exploration and optimization achieving a **99.8% reduction** in the effort to explore a 4-dimensional design space.
- Participated in a technology transfer at GKN Aerospace and provided Python training.
- Resulted in the **best paper** award by the ASME Journal of Mechanical Design in 2021.

Systems Engineering Design Lab, Chalmers University of Technology — Göteborg, Sweden

Sep 2021 – Dec 2021 *Postdoctoral Researcher*

- Authored a Python library for margin and change propagation management in engineering systems.
- Used said library in design space exploration to concurrently develop and analyze **6,552 conceptual designs** of an aeroengine component.

Khalifa University — Abu Dhabi, UAE

Dec 2016 *Visiting researcher, Center for Autonomous Robotic Systems*

- Reverse engineer a UAV for firefighting and carrying an extinguishant payload of **6 litres**.
- Achieved a flight time of **18 minutes** and resisting winds with speeds upto **8m/s**.

Aug 2013 – Dec 2016 *Research Assistant, Asset Integrity Management Systems Lab*

- Developed fiber optic structural monitoring sensors for mitigating upto **$1M of corrosion costs**.
- Developed a new accelerated corrosion testing setup to simulate **2 years of corrosion in 2 hours**.
- Mentored capstone students to build and control a **300 kg** hydraulic robot manipulator.

Education

Jan 2017 – Dec 2020 **Doctor of Philosophy** — *McGill University*

Mechanical Engineering , CGPA: 4.00

Concentraion Engineering design and optimization

Dissertation *Optimization driven set-based design under uncertain requirements*

Aug 2013 – Dec 2015	**Master of Science** Mechanical Engineering , CGPA: 4.00 Concentraion Instrumentation and photonics Dissertation *Internal corrosion detection of oil and gas pipelines using fiber optics*	*Khalifa University*
Aug 2009 – June 2013	**Bachelor of Science** Mechanical Engineering , First Class Honours, CGPA: 3.97 Capstone project *Development of a human operated mobile hexapod platform*	*Khalifa University*

Awards and recognition

May 2022 – Apr 2024	**Postdoctoral fellowship (PDF)** *National Sciences and Engineering Research council Canada*	90,000 CAD
May 2019 – Dec 2021	**Doctoral Research award (B2X)** *Fonds de Recherche du Québec - Nature et Technologies*	56,000 CAD
Jan 2017 – Dec 2019	**McGill Engineering Doctoral Award (MEDA)** *McGill University*	96,000 CAD
Aug 2013 – Dec 2015	**ADNOC Graduate fellowship** *Abu Dhabi National Oil Company*	90,000 USD

Winner of best data visualization and was ranked **2nd for best presentation** in the 11th Montreal Industrial Problem Solving Workshop	IVADO, Montreal, Canada
Led the first UAE team to successfully qualifying and competing in the Baja SAE competition	Khalifa University, Abu Dhabi, UAE
Awarded **2nd place** in the Abu Dhabi Solar Challenge (10,000 AED)	Khalifa University, Abu Dhabi, UAE

Selected publications

K. Al Handawi and M. Kokkolaras (2021). Optimization of infectious disease prevention and control policies using artificial life. *IEEE Transactions on Emerging Topics in Computational Intelligence*, doi: 10.1109/TETCI.2021.3107496 *funded by an NSERC discovery grant*

K. Al Handawi, P. Andersson, M. Panarotto, O. Isaksson and M. Kokkolaras (2020). Scalable set-based design optimization and remanufacturing for meeting changing requirements. *Journal of Mechanical Design*, *143*(2): pp 021702. doi: 10.1115/1.4047908
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Course work

- Advanced mechanics of materials
- Engineering systems optimization
- Continuum mechanics
- Applied numerical methods
- Applied finite element analysis
- Material engineering and corrosion
- Measurements and instrumentation
- Advanced vibrations
- Fracture mechanics
- Viscous and compressible fluid flows

Personal Interests

- Gymnastics and calisthenics training
- Powerlifting
- Competitive gaming
- 3D printing hobbyist
- Car modding (muscle cars) and drag racing
- Tinkering/modifying any machine I get my hands on!