Khalil Al Handawi, Ph.D.

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Profile

Application domains Technical skills Software skills IDEs Engineering software Aviation management, aerospace remanufacturing, multidisciplinary design optimization Simulation, blackbox optimization, nonlinear programming, statistical modeling, machine learning MATLAB, Python (pandas,numpy, scipy, PyTorch, Flask), C++ (CUDA,Qt), R, mySQL VSCode, Visual Studio, RStudio, XCode (basic)
Abaqus, NX Siemens, ANSYS Fluent (basic usage)

EXPERIENCE

Department of Computer Science and Operations Research, Université de Montréal

Montréal, Canada

May 2022 - Present

Postdoctoral Researcher

- Perform statistical analyses on IATA data involving flight schedules and passenger data.
- Apply community detection and graph representation learning algorithms on aviation networks.
- Maintain a mySQL database for archival, and retrieval of data.
- Extract insights and trends from learned representations relevant to air transportation.

Department 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 engagement rate of 70% with the students.
- Hosted two guest lectures with aerospace industry professionals to demo optimization applications.

Jan 2021 - Apr 2022 Postdoctoral Researcher

- Develop simulation-based decision-making tools for policy making during epidemics.
- Developed statistical COVID-19 forecasting models.
- Developed a direct search-based hyperparameter tuning framework for non-parametric models.
- Develop GPU accelerated agent-based models for high simulation throughput.

Jan 2017 – Jan 2021 Research assistant

- Worked in a Canadian/European industrial project for additive repair technologies in aerospace parts. I focused on process optimization and remanufacturing options.
- Developed mathematical tools and software for design space exploration and visualization of highdimensional design spaces that are based on blackbox optimization.
- Worked on a technology transfer at **GKN Aerospace**, providing Python training on said tools.
- 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 $Postdoctoral\ Researcher$

- Research change propagation and absorption in engineering design (applied to aeroengine systems).
- Authored a Python library for assessing the robustness of design solutions to changing requirements.
- Used said library in design space exploration to concurrently develop and analyze an aeroengine component design case and visualize the results using interactive tools.

Khalifa University

Abu Dhabi, UAE

Dec 2016 V_{i}

Visiting researcher, Center for Autonomous Robotic Systems

- Reverse engineer a drone for delivering an extinguishant payload for high-rise building fires.
- Work with the flight controls team to achieve stable flights against gust and extraneous factors.

Aug 2013 – Dec 2016

Research Assistant, Asset Integrity Management Systems Lab

- Developed fiber optic structural monitoring sensors for mitigating corrosion costs.
- Simulated a fiber optic-based corrosion sensor using waveguide equations and models.
- Developed accelerated corrosion testing setups to simulate said sensor prototypes.

EDUCATION

Jan 2017 – Dec 2020 Concentraion Dissertation	Doctor of Philosophy Mechanical Engineering, CGPA: 4.00 Engineering design and optimization Optimization driven set-based design under uncertain requirements	$McGill\ University$
Aug 2013 – Dec 2015 Concentraion Dissertation	Master of Science Mechanical Engineering, CGPA: 4.00 Instrumentation and photonics Internal corrosion detection of oil and gas pipelines using fiber optics	Khalifa University
Aug 2009 – June 2013 Capstone project	Bachelor of Science Mechanical Engineering, First Class Honours, CGPA: 3.97 Development of a human operated mobile hexapod platform	Khalifa University
Awards and re	COGNITION	
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
Our paper on scalable designs was selected for the 2021 ASME Journal of Mechanical Design Editor's Choice award		ASME IDETC 2022, St. Louis, USA
Winner of best data visualization and was ranked 2nd for best presentation in the 11th Montreal Industrial Problem Solving Workshop		IVADO, MONTREAL, CANADA
SELECTED PUBLI	ICATIONS	

SELECTED PUBLICATIONS

A. Khalil, **K. Al Handawi**, Z. Mohsen, A. Abdel Nour, R. Feghali, I. Chamseddine and M. Kokkolaras (2022). Weekly nowcasting of new COVID-19 cases using past viral load measurements. *Viruses*, 14(7): pp 1414. doi: 10.3390/V14071414

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
- $\bullet \;\;$ 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

Conversation Starters

- Competitive gaming
- Tabletop games

- 3D printing hobbyist
- Weightlifting and strength training