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Khalil Al Handawi, PhD

ABOUT ME

I am a researcher with 6 years of experience in simulation-based design, optimization, and high-performance computing. I enjoy working with large multidisciplinary teams and projects and love the prospect of mentoring and supervising other aspiring engineers.

EDUCATION

2017 – 2020 **Doctor of Philosophy**
Mechanical Engineering
McGill University

2013 – 2015 **Master of Science**
Mechanical Engineering
Khalifa University

2009 – 2013 **Bachelor of Science**
Mechanical Engineering
Khalifa University

PROFILE

SYSTEMS OPTIMIZATION

Multi-disciplinary optimization
Gradient-based optimization
Stochastic optimization
Derivative-free optimization

NUMERICAL SIMULATION

Finite element modeling
Agent-based modeling
Surrogate modeling

MACHINE LEARNING

Hyperparameter optimization
Feature engineering
Classification and regression
Sequence completion models (RNNs)

UNCERTAINTY QUANTIFICATION

Reliability-based design
Monte Carlo simulation

AWARDS

2021 **Postdoctoral fellowship**
NSERC Canada

2018 **Doctoral research award**
Fonds de Recherche du Québec

PUBLICATIONS

Google Scholar Profile

WORK EXPERIENCE

Université de Montréal MONTRÉAL, CANADA
Postdoctoral Researcher, Computer Science and Operations Research CURRENT, FROM MAY 2022

- Analyze IATA data involving **25M flight schedules** using graph representation learning.
- Develop community detection algorithms for graphs with over **10K nodes** and **100K edges**.
- Organize flight schedule data into a mySQL database for archival, and retrieval of data.

TOOLS: mySQL R

Department of Mechanical Engineering, McGill University MONTRÉAL, CANADA
Adjunct Lecturer SEP 2022 – DEC 2022

- 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 **2 guest** lectures with aerospace professionals to demo optimization applications.

TOOLS: Python MATLAB Python notebooks

Postdoctoral Researcher JAN 2021 – APR 2022

- Research simulation-based decision-making in public health and policy making during epidemics.
- Developed deep learning COVID-19 forecasting models with an accuracy of $\pm$**50 daily cases**.
- Developed a hyperparameter optimization framework for machine learning based on direct search.
- Develop GPU accelerated epidemic models for high simulation throughput (**100X**).

TOOLS: C++ CUDA Python Qt Open-source code Web application

Research assistant JAN 2017 – JAN 2021

- Part of **Canadian/European industrial project** investigating additive repair technologies for aeroengine parts. I focused on optimization of aerospace design for AM remanufacturing.
- Developed mathematical tools and software for design space exploration and optimization achieving a **99.8% reduction** in effort to explore a 4D design space relative to full factorial design.
- Participated in 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.

TOOLS: Python MATLAB Open-source code Web application

Systems Engineering Design Lab, Chalmers University of Technology GÖTEBORG, SWEDEN
Postdoctoral Researcher SEP 2021 – DEC 2021

- Research change propagation and absorption in engineering design (applied to aeroengines).
- Author 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 and visualize the results using interactive tools.

TOOLS: Python Library

SKILLS

SCIENTIFIC LIBRARIES: Qt, PyTorch, CUDA, Eigen, dlib
SOURCE CONTROL: Git, Perforce
COMPUTER AIDED DESIGN: SOLIDWORKS, NX siemens
FINITE ELEMENT SOFTWARE: Ansys-APDL, Abaqus, NASTRAN
CFD SOFTWARE: Ansys Fluent (basic usage)

DATA MANIPULATION

PYTHON	VISUALIZATION
	DATA MINING
	MACHINE LEARNING
MATLAB	TRANSFER LEARNING
	SIMULINK

SOFTWARE AND HPC

C++	OOP
	USER INTERFACE
	PARALLEL PROCESSING
	GPU COMPUTING
	IMAGE PROCESSING

SPOKEN LANGUAGES: English (Fluent), Arabic (Fluent), French (Basic)
COMMUNICATION SKILLS: Excellent written and verbal presentation skills.
Data analysis, proposal writing, and questionnaire design.
INTERPERSONAL SKILLS: Love working as a team, learning from, and teaching others.