Nicholas Sabry

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Education

PhD, Mechanical Engineering
May 2020 – July 2024

University of British Columbia

- Dissertation: "Development of friction stir welding on large multi-welded components: residual stress, distortion, and crystallographic texture in lap joints of aluminum alloys"

BASc, Mechanical Engineering
Sept 2016 – April 2020

University of British Columbia

- With distinction (4.0 GPA or +90% average)

Applicable Work Experience

Engineering and Materials Researcher

High Performance Powertrain Materials Lab
May 2020 – July 2024

- Lead researcher in Friction Stir Welding (FSW), influencing product design and program architecture to reduce residual stress while developing and maintaining manufacturing plans aligned with engineering specifications.
- Conducted a comprehensive characterization assessment on the effects of FSW on multi-welded components, using findings to resolve technical challenges and implement new engineering principles through detailed presentations and reports for head engineers.
- Support efficiency-driven practices and technologies while developing and applying production and tooling methodologies.

Industrial Collaboration

National Research Council - METALTec industrial R&D group
May 2023 – June 2024

- Conducted neutron diffraction studies to determine how the sequence and application of Friction Stir Welds affect residual stress in standardized plates, leading to optimized welding strategies for multi-welded components.
- Performed Electron Backscatter Diffraction (EBSD) analyses to establish a correlation between texture evolution and FSW tool parameters, providing critical insights for refining weld quality.
- Utilized these findings to enhance welding techniques, improving the structural integrity and performance of multi-welded components.
- Designed, prototyped, and machined a casting system to standardize the production of cast plate material, ensuring consistent quality in dissimilar lap friction stir welds.

Nemak Canada and Nemak Global
May 2020 – June 2022

- Initiated and led a research project investigating the effects of FSW and subsequent straightening processes on residual stress evolution in dissimilar aluminum alloys, providing critical insights for optimizing manufacturing techniques.
- Conducted comprehensive optical and scanning electron microscopy analyses to establish correlations between residual stress, mechanical properties, and microstructure, enhancing the understanding of welded material behavior.
- Utilized Energy-dispersive X-ray spectroscopy and 3D computed tomography to characterize stirring interactions between dissimilar FSW materials, offering valuable data for material compatibility and performance improvements.
- Applied research findings to optimize the manufacturing process for high-efficiency hybrid-electric vehicle battery trays, contributing to their successful mass production.

Previous Research Collaborations

LTH, Lund University of Technology
May 2018 – July 2018

- Led fitness-for-service evaluations of novel aluminum alloys for next-generation internal combustion engines, using advanced material analysis and testing to ensure suitability for demanding applications.
- Characterized aluminum alloys enhanced with rare earth elements like Cerium, assessing mechanical properties such as creep, tensile strength, torsion, and fatigue at room temperature to validate performance under operational conditions.
- Applied advanced optical microscopy and embedded analysis systems to precisely differentiate between brittle and ductile fracture modes, providing critical insights into material failure mechanisms and improving alloy design.

Teaching Experience

ENGR 377 – Manufacturing Processes (Head Teaching Assistant)   Sept 2020 – Dec 2022

- Successfully taught a 3-credit Methods of Manufacturing course across multiple years, delivering complex problem-solving and calculations to four sections of 35-40 students each, demonstrating strong instructional skills in large group settings.
- Effectively managed and coordinated a cohort of 140 engineering students, ensuring the timely and successful completion of all group research reports through organized guidance and support.
- Administered and invigilated final exams for a large student body, meticulously grading all reports and exams to maintain high academic standards.

Additional Interesting Projects

Production Enhancement – Tolko Industries   Sept 2019 – April 2020

- Led a team of five in the successful design, construction, and testing of an improved production layout for industrial fruit crates, significantly enhancing operational efficiency.
- Designed and optimized processes and production layouts for equipment installation, assembly, machining, and material handling, ensuring streamlined and effective operations.
- Implemented 5S+1 systems, preventive maintenance schedules, and PLC upgrades to boost bin production efficiency and consistency, driving measurable improvements in output and reliability.

Skills

Software/Program Experience

Languages	MATLAB, Python, C++
CAD	SolidWorks (+8 years)
Visualization Tools	Matplotlib, MATLAB, PowerPoint
IDE	Visual Studio
Simulation Techniques	OpenFOAM, MATLAB & Simulink

Experimental

Techniques	SEM, EDX, XRD, EBSD for Texture Analysis, Tensile, Fatigue, Fracture, Hardness, Neutron Diffraction for Stress Analysis
Machining & Prototyping	Lathe, Mill, Waterjet, Welding, CNC, Casting, 3D Printing