NICHOLAS SABRY

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Education

PhD, Mechanical Engineering **May 2020 – Present**
University of British Columbia

BASc, Mechanical Engineering **Sept 2016 – April 2020**
University of British Columbia
- With distinction

Language Proficiency

- English (first language)

Awards/Recognition

- UBC Okanagan Graduate Research Scholarships (2022) - $4,200
- University Graduate Fellowship (2021) - $5,800
- Special University of BC Okanagan Graduate Award
- British Columbia Graduate Scholarship (2020) - $15,000
- Graduate Dean Entrance Scholarship (2020) - $5,000
- Go Global International Learning Programs Award (2019) - $2,000
- NSERC Undergraduate Student Research Award (2019) - $3,000
- BC Hydro Scholarship in Engineering (2018) - $1,000
- Deputy Vice-Chancellor Scholarship for Continuing Students (2016, 2019) - $1,000 per year
- 3rd Place – Western Engineering Competition (2019)
- 1st Place – UBC Re-Engineering Competition (2018)
- 1st Place – UBC Hovercraft Best Presentation Award (2018)
- 1st Place – UBC Hovercraft Competition (2018)
- 1st Place – Gearbox Design Competition (2017)
- 1st Place – UBC CAD/CAM Competition (2016)

Applicable Work Experience

Engineering and Materials Researcher **May 2020 – Present**

High Performance Powertrain Materials Lab
- Lead researcher in Friction Stir Welding (FSW)
    - Coordinated successful equipment acquisition, managed neutron diffraction beamtime proposals, and implemented thorough safe operating procedures
    - Directed the coordination of industry presentations, and monitored project deadlines to ensure efficient project completions
    - Conceptualized and executed a comprehensive characterization assessment, providing novel insights into the effects of friction stir welding on complex multi-welded components

Industrial Collaboration **May 2020 – Present**

Nemak Canada and Nemak Global
- Established a research project that examined the effects of friction stir welding and subsequent straightening processes on the evolution of residual stress in dissimilar aluminum alloys (wrought 6061 - HPDC A365)
- Conducted extensive optical and scanning electron microscopy analyses to draw correlations between the residual stress, mechanical properties, and microstructure of the welded materials
- Utilized advanced Electron Backscatter Diffraction (EBSD) analyses to study texture evolution and its correlation to mechanical property variations at the weld surface

- Applied Energy-dispersive X-ray spectroscopy and computed tomographic 3D maps to characterize the stirring characteristics between dissimilar friction stir welded materials (wrought 6061 - high pressure die cast A365)
- The insights gained from this research were used to optimize the manufacturing process of high-efficiency hybrid-electric vehicle battery trays, which are now in mass production

METALTec industrial R&D group

- Determined the effects of the order and application of friction stir welds on the evolution of residual stress standardized plates by conducting neutron diffraction studies
- Performed EBSD analyses to correlate texture evolution as a function of FSW tool traverse direction and speed parameters
- Once finished the results from this work will be used to optimize the application of welds on multi-welded components
- Developed an innovative casting design to standardize the casting plate material required of a dissimilar lap friction stir weld

Previous Research Collaborations **May 2018 – July 2018**

LTH, Lund University of Technology

- Conducted fitness-for-service characterization of novel aluminum alloys for next-generation IC engines, utilizing state-of-the-art material analysis and testing equipment
- Employed state-of-the-art techniques to characterize the aluminum alloys with additions of rare earth elements, such as Cerium, to evaluate mechanical properties at room temperature, including creep, tensile, torsion, and fatigue
- Utilized advanced optical microscope and embedded analysis systems to accurately quantify differences in brittle and ductile modes of fracture and analyze the resulting fracture surface

Teaching Experience

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

- Record of teaching a highly successful 3-credit course in Methods of Manufacturing (2020W1, 2021W1, and 2022W1), covering complex problem-solving and calculations across four sections of up to 35-40 students per section
- Diligently managed and coordinated a cohort of 140 engineering students, facilitating their successful completion of all group research reports
- Administered final exams with attention to detail, invigilating and correcting all final reports and exams to ensure academic quality

Software/Program Experience

- Word/Excel/PowerPoint, MATLAB, SolidWorks, Thermo-Calc, ImageJ, C++

Extracurriculars/Additional Interesting Projects

Production Enhancement – Tolko Industries **Sept 2019 – April 2020**

- Led a team of 5 to successfully design, construct, and test an improved bin production layout for industrial fruit creates
- Designing processes, and production layouts for equipment installation, assembly, machining and material handling
- Utilizing 5S+1 systems, preventive maintenance schedules, and PLC upgrades to increase bin production efficiency and consistency

Oral Conference Presentations

- TMS 2023 Conference, “Effects on Microhardness, Texture, and Element Concentration Between the Sliding and Sticking Mechanism During Friction Stir Welding”, San Diego, March 2023.

Publications

- N. Sabry, J. Stroh, D. Sediako, G. Byczynski, A. Lombardi, and A. Payzant, “Stress characterization for friction-stir-welded electric vehicle battery trays with application of neutron diffraction,” J. Manuf. Process., vol. 101, pp. 1109–1123, 2023, https://doi.org/10.1016/j.jmapro.2023.06.035
- N. Sabry, J. Stroh, and D. Sediako, “Characterization of microstructure and residual stress following the friction stir welding of dissimilar aluminum alloys,” CIRP J. Manuf. Sci. Technol., vol. 41, pp. 365–379, 2023, https://doi.org/10.1016/j.cirpj.2022.11.021
- N. Sabry, J. Stroh, and D. Sediako, “Effects of the Friction Stir Welding Sliding and Sticking Mechanisms on the Microhardness, Texture, and Element Concentration,” Light Met. 2023, pp. 365–375, 2023, http://dx.doi.org/10.1007/978-3-031-22532-1_51