NICHOLAS ONG

Mechanical Engineering

@ nicholas.ong@mail.mcgill.ca (438)-873-1479 linkedin.com/in/ong-nicholas Montreal, Quebec

EXPERIENCE

Turbine Rotating Systems Engineering Intern

Pratt and Whitney Canada

June 2019-Oct 2019 Longueuil, QC

- Developed a unified lifing methodology for thermo-mechanical fatigue failure of turbine blades
- Analyzed failure mechanisms of crack initiation and crack propagation in orthotropic single-crystal superalloys
- Applied finite element software ANSYS MADPL and theoretical failure mechanics to assess damage parameters and the effects of shot-peening on turbine blades

Defense and Aerospace Product Development Engineering Intern

Advanced Cooling Technologies

June 2018-Sep 2018 Lancaster, PA

- Designed a phase-change material plate heat exchanger for cooling of directed energy weapons (DEW)
- Developed SolidWorks production drawings of custom copper-water heat pipes for clients
- Fast Fourier Transform (FFT) analysis of latent heats of fusion of n-Octadecane and n-Eicosane as phase change materials for a wax-based PCM heat sink

ACHIEVEMENTS

- 4-year Dean's Honor List for the McGill Faculty of Engineering (2016-2020)
- Winner of the Pratt and Whitney Targeted Scholarship (2020)
- McGill Engineering Competition, 2nd place: designed a transportation solution and physical model for autonomous ravine crossing (2016) and barge transportation (2017)
- McGill University CAD|Madness, 2nd place: used SolidWorks to design a capacitive, electronic ticket counter and dispenser for use at Engineering Undergraduate Society events (2017)
- Pennsylvania State Champion in technological debate (2016)

SKILLS

Analysis & Design: **SolidWorks, ANSYS CFD, ABAQUS**
Content: **Creative Writing, Public Speaking**
Software: **LaTeX, MasterCAM, Excel**
Programming: **MATLAB, Python**

EDUCATION

Bachelor of Engineering (Mechanical)

McGill University: GPA 3.98/4.00

Est Grad. Dec 2020 Montreal, QC

WRITING

- *Jack the Jet Engine*, a children's book about the mechanisms of air-breathing turbofan machinery
- *Baby's First Bessel*, a children's book about the use of Bessel functions on the playground

PROJECTS

Mock Nuclear Fusion Reactor Facility Design (2019-2020)

- Designed, analyzed, and manufactured an optically clear Taylor-Couette (TC) flow facility with interchangeable geometries to investigate the turbulent flow characteristics of a liquid metal vortex used to compress plasma to a fusion state
- Performed mechanical analysis on TC flow facility accounting for Taylor vortices and cavitation effects
- Provided conflict mediation for a team of 4 to effectively meet deadlines and generate design iterations

Particle Swarm Optimization Methods (2020)

- Used Python and MATLAB to generate a particle swarm optimization metaheuristic to optimize non-differentiable functions

Blood Flow Analysis in the Iliac Bifurcation (2020)

- Identified and analyzed aneurysm risk factors in the context of hemodynamic loads using pressure and wall shear stress contours
- Used CFD program ANSYS Fluent to measure and animate the velocity profiles affected by an abdominal aneurysm in the iliac bifurcation

Applications of Seismic Metamaterials (2020)

- Researched the history and modern-day use of phononic crystals in the context of seismic metamaterial cloaking for earthquake-resilient cities
- Presented a comprehensive report on current research for resonant metawedges and buried seismic resonators

Literature Review on Octopus Sucker Biomechanics (2019)

- Performed an in-depth review of sucker mechanics and biomimetic adhesion in soft robotics
- Among top 3 presentations in graduate-level *Mechanics of Biological Materials* class

Collaborative Design Project (2018)

- Designed and 3D printed a robotic manipulator with 3 degrees of freedom for a remotely-operated, Arduino- controlled rover capable of wall-climbing, battery replacement, and debris avoidance