

# NICHOLAS ONG

## Mechanical Engineering

@ nicholas.ong@mail.mcgill.ca

☎ (438)-873-1479

in [linkedin.com/in/ong-nicholas](https://www.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

- Dean's Honor List; Faculty of Engineering (2016-2020)
- Pratt and Whitney Targeted Scholarship (2020)
- McGill Engineering Competition; 2nd place (2016, 2017)
- McGill CAD|Madness; 2nd place (2017)
- Pennsylvania Technology Student Association; 1st place, Technological Debate (2016)

## SKILLS

#### Analysis & Design

**SolidWorks, ANSYS Mechanical, ANSYS Fluent, ABAQUS, MasterCAM, FEBio**

#### Content

**Creative Writing, Public Speaking**

#### Software

**LaTeX, Excel, Minitab**

#### Programming

**MATLAB, Python**

## EDUCATION

### Bachelor of Engineering (Mechanical)

**McGill University: GPA 3.96/4.00**

📅 Grad. Winter 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
- Translated client desires to engineering design parameters using Quality Function Deployment (QFD) and House of Quality
- Provided conflict mediation for a team of 4 to effectively meet deadlines and generate design iterations

### Particle Swarm Optimization Methods (2020)

- Used Python to develop a particle swarm optimization algorithm based on swarm intelligence
- Optimized tuning parameters with Clerc's constriction factor to improve algorithm efficiency

### 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
- 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