

# Shirley Zhang

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## EDUCATION

**University of Toronto, GPA: 3.94/4.00**

*Bachelor of Applied Science, Civil Engineering Major and Artificial Intelligence Minor*

Ontario, Canada

Graduation April 2022

## TECHNICAL SKILLS

**Programming Languages:** Python, C++, C#, MATLAB, HTML/CSS, Excel VBA

**Frameworks & Libraries:** Qt, Pandas, Scikit-learn, Numpy, Matplotlib, Jupyter, PyTorch, SQL

**Structural Analysis:** SAP2000, ETABS, SAFE, S-Frame, GSA, Tedds, Abacus FEA, Mathcad

**Modeling and Mark-up:** AutoCAD, Revit, SketchUp

## WORK EXPERIENCE

**Nuclear/Civil Engineering Intern**

Sept 2020 – Present

*Terrestrial Energy*

- Designed the reactor building and reactor vessel support structure for the next generation of nuclear power plants
- Researched and developed methodology for aircraft impact analysis to be presented at a global nuclear conference
- Created a Python application to automate aircraft impact modelling and reduced repetitive manual work by 90%

**Structural Engineering Intern**

Jun 2020 – July 2020

*Arup*

- Developed a C# application to automate wind/snow load calculations and improved analysis efficiency by ten-fold
- Proposed retrofitting techniques to mitigate damage from crowd-induced floor deflection for Ohio State University
- Designed stiffener beams, columns and tuned mass dampers to reduce floor acceleration by 70%

**Software Engineering Intern**

May 2019 – Aug 2019

*Rocscience*

- Implemented liquefaction and ground improvement features for a 3D geotechnical analysis software using C++
- Contributed to theoretical research, backend development, user interface design, and documentation
- Added new dry sand settlement calculation and visual display to existing liquefaction analysis module
- Created a new analysis module to calculate soil stiffness and settlement after ground improvement

**3D-Printing Assistant**

Sept 2018 – Feb 2019

*U of T Entrepreneurship Hatchery*

- Managed and fulfilled 3D-printing orders from over 50 start-ups, research groups, and design teams on campus
- Communicated with clients to offer design advice, estimate cost, establish timeline, and complete print jobs

## PROJECTS

**COVID-19 Hospital Expansion** | *Python, ETABS, SAP2000*

2020 - 2021

- Led a team of 20 students to design a scaled vertical expansion of a hospital building for international competition
- Improved hospital capacity by 40% while maintaining resilience to an equivalent M9.0 earthquake
- Developed a Python application and Qt interface to perform > 10,000 design iterations in SAP2000

**Computer-aided Canoe Design Competition** | *C++, MATLAB, Python*

2019 - Present

- Leveraged MATLAB to calculate stress due to static&dynamic loading using fluid-structure interaction principles
- Used C++ and Python to approximate the hull geometry with least resistance and won 4th place nationally

## RESEARCH PUBLICATIONS

[1] Y. Zhao, H-N Li, X. Fu, S. Zhang, O. Mercan. "Seismic Analysis of a Large LNG Tank Considering the Effect of Liquid Volume". *Shock and Vibration* (2020). <https://doi.org/10.1155/2020/8889055>

[2] Y. Zhao, H-N Li, S. Zhang, O. Mercan, C. Zhang. Seismic Analysis of a Large LNG Tank Considering Different Site Conditions. *Applied Sciences* 10(22):8121 (2020). <https://doi.org/10.3390/app10228121>