# Bonnie Chao

**Contact**
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**Websites**

## Education

PhD | Clinical Data Science
University of Toronto, Institute of Biomedical Engineering
2019-Present

BASc | Materials Engineering, Minor in Bioengineering
University of Toronto
2014-2019

## Skills

**Software**
Python, C Programming, SQL, ANSYS, MATLAB, Solidworks, Tableau, Graphpad, JMP (SAS)

**Python Packages**
PyTorch, Lightning, XGBoost, SHAP, Sci-kit Learn, Numpy, Pandas, Seaborn, Matplotlib, Pillow

**Spoken Languages**
English, Mandarin

**Laboratory**
Industrial Plasma Etcher, Physical Vapor Deposition, Organic Synthesis, Laboratory Polymer Fabrication, Clean Room and Operating Room Training, Polymerase Chain Reaction, Automated ELISA platforms, Scanning Electron Microscopy, Fourier Transform Infrared Spectroscopy, Ellipsometry, X-ray Photoelectron Spectroscopy, Gas-Chromatography Mass Spectroscopy

## Interests

**Data Science**
Statistics, machine learning, computer vision, data visualization

**Biomedical and Materials Engineering**
Diagnostics, health economics, inorganic and organic chemistry, material characterization

**Other Interests**
Piano, trivia, hiking, skiing, cosmetic chemistry, visual arts

## PhD Research

2019-2024 **Toronto Lung Transplant Program**
Supervising Professors: Dr. Shaf Keshavjee, Dr. Bo Wang
- Trained XGBoost models to predict transplant outcomes using donor lung tabular data and to predict COVID-19 hospitalization using patient emergency department data
- Trained convolutional neural networks from longitudinal ex vivo donor lung radiographs to predict transplant outcomes
- Applied principal component analysis and class activation mapping to interpret neural network predictions
- Performed extensive statistical analysis on the uniformity of biomarker expressions from different donor lung sampling locations
- Visualizes data using the Seaborn package in Python for various scientific publications
- The research work so far has resulted in 4 first-author manuscripts, 4 co-author manuscripts, 2 patent applications, 5+ mentored students, 3 awards, 1 major change in the clinical practice of lung sampling, and 16 conference presentations

## Work Experience

2022-24 **Skincare Consultant** Sephora, Canada
- Attentively addressed client concerns, actively listening to their needs and providing tailored solutions, fostering client loyalty and repeat business
- Communicated the chemistry of ingredients, skin anatomy, and the mechanisms behind the effectiveness of various products to a diverse audience.
- Cultivated positive and amicable relationships with colleagues from diverse backgrounds.
- Efficiently organized products on shelves and in storage to maximize space utilization, enhance overall work efficiency, and drive sales
- Maintained top-tier sales status from the program launch to the end of term (Part-time, 15 hours weekly)

2019-2021 **Diagnostics Intern** SQI Diagnostics, Canada
- Coordinated the implementation and troubleshooting of an automated, clinical diagnostic platform in the operating room
- Trained >5 personnel to use the automated platform
- Improvement of the user interface of the clinical platform ranging from platform setup, software usage, experimental process, operator workflow, error assessment and prevention, to efficiency enhancement, using human factor principles by actively participating in user experience and collecting user feedback
- Validated the automated clinical platform and improved user interface for FDA approval using human factor principles

2017-18 **Process Engineering Intern** Air Liquide Laboratories, Japan
- Research on plasma etching of low-k silicon semiconductors under various gas combinations, flow rates, and other conditions to optimize for surface film etching
- Analyzed samples and evaluated gas performances using SEM, FTIR, XPS, and ellipsometer
- Created three-dimensional graphical models of the etching process
- Fabricated organic LED devices through physical vapor deposition
- Calibration analysis of chemicals using gas-chromatography mass-spectroscopy
- Silicon wafer cleaning using hydrogen fluoride, cutting, sputtering, and surface analysis

## Awards

2023 Best Presentation (100 CAD), AI in Medicine Conference
2023 Best Presentation (20 CAD), Transplant AI Symposium
2023 Best Presentation (100 CAD), Toronto Biomedical Engineering Conference
2019-2021 Mitacs Accelerate Program (50,000 CAD), Mitacs
2021 Vanier Graduate Scholarship (Selected by the school department), Canada Graduate Scholarships
2016-19 Dean's Honour List, University of Toronto
2017 Undergraduate Summer Research Program (4,500 CAD), National Science and Engineering Research Council
2017 Translational Biology and Engineering Program (3,000 CAD), Ted Rogers Centre for Heart Research
2017 Best Presentation (20 CAD), Galbraith Society

## Extracurricular Activities

2022-2023 **Teaching Assistant** University of Toronto
BME1478 Coding for Biomedical Engineers, BME205 Foundation of Biomedical Engineering
- Discusses assignments and troubleshoots coding issues with students
- Prepared and led tutorial discussions and problem solving

2023 **Interviewee** Ajmera Transplant Podcast
- Produced and recorded a podcast episode on the PhD research

2021-2023 **Mentor** STEM Fellowship
- Regularly met with mentees in high school and undergraduate studies to explore and discuss career directions, university programs and lifestyle, and much more (Number of mentees: 6)
- Mentored two teams of four students in Research Exploration Opportunity and proposal writing

2022 **Interviewee** CTV News
- Participated in an interview for the production of a news story

2022 **Case Study Team Member** Life Science Career Development Society
- Worked on a new drug submission in a regulatory affairs industry case study
- Presented monthly in front of a panel of industry professionals in regulatory affairs

2021-22 **Keyboardist/Singer** Casual Band
- Practiced regularly with other musicians and performs at bars and restaurants

2015-17 **Piano Accompanist and Song Arranger** Choir at University of Toronto
- Arranged five songs that were performed at the year-end concert

## Undergraduate Research Experience

2018-19 **Thesis Student** Department of Materials Science and Engineering
- Synthesized and characterized PFOB nano-droplets as a drug carrier
- Investigated drug release profile through peroxidation of the lipid membrane

2017 **Summer Research Student** Ted Rogers Centre for Heart Research
- Fabricated novel polyurethane scaffolds developed by the lab
- Isolated adipose stem cells from human tissues. Cultured, seeded, and differentiated cells on scaffolds
- Quantified the effect of scaffold material on the development of vascular constructs
- Compiled an extensive report and presented at three major research events in the university

2016-17 **Research Student** Hospital for Sick Children (PGCRL)
- Research on effectively producing elastin in a laboratory setting
- Observed molecular changes in elastin using nuclear magnetic resonance during mechanical testing
- Presented findings at Galbraith Society, University of Toronto

2016 **Summer Research Student** National Health Research Institutes of Taiwan
- Fabricated micro-scale polymer devices through polymer mixing, molding and curing
- Cultured adipose stem cells in devices and observed cell growth under a fluorescence microscope
- Analyzed results and improved experiments by coating the devices and adjusting parameters
- Presented at the Taiwan Tech Trek conference