

# LEO ZHU

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*MD/PhD candidate for the consideration of etc etc*

## EDUCATION

### **Bachelor of Applied Science in Chemical Engineering, University of Toronto (9/2014-4/2018)**

- Graduated with Honors and a minor in Bioengineering
- 3.78cGPA, scored 521 (99th percentile) on the MCAT

### **Master of Applied Science in Chemical Engineering, University of Toronto (9/2018-Present)**

- *Physiologically-Based Pharmacokinetic and Metabolism Model for Predicting Psychomotor Effects of Blood Cannabinoid and Ethanol Concentrations* (Supervised by Dr. Radhakrishnan Mahadevan)
- Developed a PBPK Model in MATLAB with literature based parameters and data to gauge the psychomotor effects of alcohol and cannabis usage post Canadian Legalization of cannabis, collaborated with the Center for Addiction and Mental Health (Toronto) to validate the model, collaborated with the Thiele Lab at National University of Ireland at Galway to add genomic components to the model.
- Supervised 2 undergraduate thesis students (Timothy Liu, William Pei) on modelling the effects of current drug therapies for hypercholesterolemia and exploring novel dietary interventions.

## Research Experiences

### **Undergraduate Researcher, University of Toronto (4/2016-8/2016)**

- Development and Transplantation of a Bioengineered Construct of the Outer Retina to Rescue Vision in Mice Models of Retinal Degeneration (Supervised by Dr. Molly Shoichet and Dr. Nikolaos Mitrousis)
- Performed confocal microscopy, immunohistology, mice handling, cryosectioning, Image J and ANOVA to assist in data collection and analysis, resulting in verification of  $\text{NaIO}_3$  models of retinal degeneration, quantification of murine vision over a longitudinal study, production of end-point retinal morphology figures for future publishing, an NSERC USRA award, and two presentations.

### **Undergraduate Researcher, University of Toronto (10/2015-3/2016)**

- Transcutaneous Stimulation of the Posterior Tibial Nerve and Saphenous Nerves to Alleviate the Symptoms of Overactive Bladders (Supervised by Dr. Paul Yoo)
- Organized a team of 6 students to create a literature review of existing treatments of Overactive Bladder, developed an experimental protocol involving volunteers and consent forms, created a Research Ethics Board approved study on a cohort of human subjects, and culminating in a presentation.

### **Undergraduate Researcher, University of Toronto (1/2015-4/2015)**

- Assessment of King's College Circle to Improve Pedestrian Safety (Independent Research Group)
- Initiated a portfolio on improving the safety and clarity of traffic directions at King's College Circle at the University of Toronto, performed goal setting and vision development with team members, outreached to administration and urban planning professors for resources, and published a report suggesting a plaza to allow 86,000+ students to safely travel across campus.

### **4th-year Capstone Project, University of Toronto (9/2017-12/2017)**

- Pilot Plant for Glycerol Carbonate Production
- Collaborated with a team of 6 members to create a pilot plant for the production of a carbon negative solution to produce Glycerol Carbonate from Biodiesel By-Products and Industrial Flue Emissions, performed company vision setting, plant equipment sizing & layout, process control, environment & safety considerations, economic analyses, prepared a 45-minute presentation with 3-D visualizations of the plant, and awarded the Best Process Design in the class.

### **Course Project, Biomedical Engineering Technology and Investigation, University of Toronto (9/2017-12/2017)**

- Effects of Detergents on the Removal of Gold Nanoparticles from Tumor Tissue
- Performed experimental design to resolve the color-changing capabilities of gold nanoparticles in confocal microscopy imaging via experimenting with methods of removal, practiced the deparaffinization and rehydration of histology slides, tissue permeabilization, silver staining, and hematoxylin & eosin staining; performed data acquisition with Leica microscopy, quantification with color deconvolution through writing macros in ImageJ, and used GraphPad Prism for statistical analysis with Tukey and Bonferroni corrections.

## Publications and Presentations

### Peer Reviewed

1. Nikolaos Mitrousis, Sabiha Hacibekiroglu, Katariina Mamia, Zhengyue Zhu, Beatrice Ballarin, Peter Poon, Vallerie A. Wallace, Yves Sauve, Andras Nagy, Derek van der Kooy, Molly S. Shoichet; **Co-transplantation of RPE and photoreceptors rescues vision in a mouse model of advanced retinal degeneration.** *Invest. Ophthalmol. Vis. Sci.* 2018;59(9):3261. [journal]

### Non-Peer Reviewed

2. Leo Zhu, William Pei, Radhakrishna Mahadevan; **PBPK Model for Predicting the Effects of Cannabis and Ethanol on Driving.** *Biomedical Engineering Society Annual Meeting.* Philadelphia, 2019. [poster]
3. Leo Zhu, Radhakrishna Mahadevan; **Whole Body Metabolism Model for Predicting Blood Cannabinoid Concentrations.** *Synthetic Biology Symposium 4.0.* Waterloo, 2019. [abstract][oral][poster]
4. Leo Zhu, Radhakrishna Mahadevan; **Whole Body Metabolism Model for Predicting Blood Cannabinoid Concentrations.** *Toronto Cannabis and Cannabinoid Research Consortium.* Toronto, 2019. [abstract][poster]
5. Leo Zhu, Radhakrishna Mahadevan; **Multiscale Modelling of Blood Cannabinoid Concentrations.** *Statistics and Control.* Toronto, 2019. [oral]
6. Leo Zhu; **How I scored 99th percentile on the MCAT.** *Independently-hosted Seminar.* Toronto, 2019. [oral].
7. Leo Zhu, Radhakrishna Mahadevan; **Multiscale Metabolic Modelling for Predicting Blood Cannabinoid Concentrations.** *BioZone Fall Symposium.* Toronto, 2018. [3-minute thesis]
8. Sabrina Sikora, Tania Das, Mahmoud Ali, Delin Mu, Sean Cuthbertson, Leo Zhu; **Pilot Plant for Glycerol Carbonate Production from a Biodiesel By-Product and Industrial Flue Emissions.** *33rd Annual Chemical Engineering Dinner.* Toronto, 2018. [poster]
9. Leo Zhu, Nikolaos Mitrousis, Molly Shoichet; **Co-Injection of RPE and Photoreceptor Cells to Rescue Vision in Retinal Degeneration.** *Undergraduate Engineering Research Day.* Toronto, 2016. [abstract] [oral]
10. Leo Zhu, Nikolaos Mitrousis, Molly Shoichet; **Reversing the Effects of Retinal Degeneration.** *Canadian Society for Chemical Engineering Symposium.* Toronto, 2016. [oral]
11. Nabaa Al Kassab, Liam D'Souza, Kelly Hunter, Peter Kim, Leo Zhu; **Transcutaneous Stimulation of the Posterior Tibial and Saphenous Nerves.** *Galbraith Society Research Experience Program Final Presentation.* Toronto, 2016. [oral]
12. Stephen Xu, Leo Zhu, et al.; **Improving the Safety of King's College Circle.** *Student Research Teams 2014-2015 Annual Report.* Toronto, 2015. [report]

## Leadership Experience

### **Vice President/Treasurer/Social Chair, Sigma Chi Fraternity, Beta Omega Chapter (4/2017-Present)**

- Spearheaded and executed the development of various social, philanthropic, and outreach projects, organized and led weekly meetings with an executive team of 11 members, pioneered and promoted an annual welcome event for 1200 incoming students, trained at a week-long leadership summit on improving adaptability and emotional intelligence, allocated and managed a budget of \$38400 to ensure proper committee function, programmed and converted budget management to an automated digital system with precise recordkeeping to improve transparency and precision, ultimately resulting in the creation of same-day reimbursements, increasing cumulative membership by 51, increasing social media following by 37%, and fully subsidizing the year-end formal event for all members and guests with an annual budget saving of \$8000.

### **Internal Communications Coordinator, BioZone Council (1/2019-Present)**

- Organized internal communications within graduate department, planned monthly meetings and contributed to monthly newsletters, planned and assisted in the execution of the annual BioZone Research Symposium, Science Rendezvous for educating primary school children on bioengineering, and various social events.

### **Founder/President, University of Toronto Electronic Music Community (1/2017-4/2019)**

- Established a community for electronic music enthusiasts across 3 campuses, created social media outlets to build brand name recognition, recruited membership via ticket raffles, dance meet-ups and lessons, DJ tutorials, and organized 4 successful music events involving the planning of logistics, designing of 5 different stages, and hiring 23 DJs, cumulatively engaging 44600 netizen, selling over 600 tickets to collect \$2780.00 in reinvested profits and \$415 donated to Covenant House Toronto to assist underprivileged youth, ultimately bequeathing the club with 621 members.

### **Orientation Package Chair, University of Toronto Engineering Society (3/2015-9/2015)**

- Managed a budget of \$55000 for the creation of welcome packages for incoming students, negotiated with 5 different suppliers for cost optimization, organized and created distribution logistics involving the recruitment of 25 volunteers, gave ad hoc and regular presentations for transitional and transparency purposes, and collaborated with marketing and sponsorship chairs to produce 1200 Orientation Packages with a cost reduction of 20%, and an increase in package contents of 30%.

### **Outreach Chair, UofT Engineering Society (3/2016-9/2016)**

- Consolidated a list of 115 companies using LinkedIn to generate sponsorship revenue for incoming student orientation week, communicated with 6 internal subcommittees to allocate sponsorship deals, resulting in a 100% increase in the numbers of sponsors from previous years and an additional \$2000 added to the overall orientation week budget.

### **Moderator/Manager, Model United Nations (9/2010-4/2018)**

- Designed debate topics for various Model United Nations conferences across highschool and university levels based on researching historical sources, planned and executed simulated crises related to Rio Olympics (UTMUN 2016), 30 Years' War (SSICSIM 2017), Lebanese Civil War (UTMUN 2017), Colombia Congress (NAMUN 2018), and the World Health Organization (OMWHO 2018) in sessions ranging from 20 to 100 participants.

## VOLUNTEERING

### **Kitchen Cook and Dishwasher Volunteer, St. Felix Center (8/2016-5/2018)**

- Assisted staff in cooking and serving for struggling economically families, mentored new volunteers to quickly adjust to work pace, optimized food handling and plating with a continuous product line to increase service speed by 40%, created a dishwashing system to eliminate downtime during operation, worked with peers to create 100+ meals a day under strict time constraints, served as liaison between St. Felix Center and campus groups to increase community engagement during holiday seasons.

### **Greeter and Surgical Clerk Volunteer, Mount Sinai Hospital (5/2017-5/2018)**

- Elective Outpatient Surgery Unit: Observed surgeries in urology with fertility and andropause directors, practiced intubation, laparoscopy, and suturing on dummies, acquired insight into surgical logistics, provided post-op care for patients with refreshments and amenities, assisted and provided care for patients with mental disabilities, attended seminars conducted by fellows as an ultrasound model.
- Information Desk: Directed patients and families to desired locations in a rapid yet friendly manner, updated directory with new information, assisted patients with wheelchair transport and calling taxis, assisted EOPS ward clerk in unit paperwork, interpreted for mandarin speaking families.

## WORK EXPERIENCES

### **MCAT Instructor, Kaplan (12/2017-Present)**

- Prepared 2 cohorts of students for the Medical College Admissions Test by utilizing the Socratic method for active engagement in the classroom, assisted with online help sessions, and coached students on the importance of time management and schedule planning to guide them in their journey towards medical school, resulting in an average increase of MCAT scores of \_\_\_\_, an average score of \_\_\_\_\_ (\_\_\_\_percentile), and an instructor satisfaction rating of 9.7/10.

### **Life Science Curriculum Developer, Top Knowledge (8/2019-Present)**

- Developed teaching curricula and an accompanying study guides in accordance with current university materials, taught weekly offline classes in chinese and utilized flipped classroom methodologies to record review videos in english, provided live support via WeChat Messenger, increases grades from a class average of 47% to \_\_\_\_\_.

### **Teaching Assistant, University of Toronto (9/2018-Present)**

- Engineering Strategies and Practice: Guided a total of 18 groups of 6 through the engineering design process, advised students on the semantics of engineering communication documents, and received an average TA rating of 3.9/5.
- Applied Differential Equations: Monitored and assisted students in solving chemical engineering-based differential equations problems in MATLAB.

### **Private Tutor (9/2019-Present)**

- Held weekly chemistry meetings with highschool student to bring initial grade of 37% to \_\_\_\_\_.

### **Independent Contractor (5/2018-9/2018)**

### **Host and Food Handler, Fifth Social Club (5/2018-7/2018)**

### **Campus Ambassador, One Class (2/2016- 6/2016)**

### **Line Chef, Burger King (8/2014-10/2014)**

## Honors, Awards, Achievements

**McLean Foundation Graduate Scholarships** (9/2019) - \$15000

**Highest GPA Award** (4/2019) - Sigma Chi Fraternity, \$1000

**NSERC Create M3** (9/2018) - NSERC, \$15000

**2nd Highest GPA Award** (4/2018) - Sigma Chi Fraternity, \$750

**University of Toronto Dean's List** (2015 - 2018)

**2nd Highest GPA Award** (4/2017) - Sigma Chi Fraternity, \$750

**Best Plant Design Process Engineering** (3/2017)

**Horizons Leadership Development Scholarship** (7/2017) - Sigma Chi Fraternity, \$2700

**NSERC Undergraduate Student Research Awards** (5/2016) - NSERC, \$4500

## OTHER INTERESTS

### **Athletics** (9/2011-Present)

- New Dragons Dragon Boat Team (9/2016-7/2018), placed 2nd place internationally at the 2018 Club Crew World Championships in Szeged, Hungary for the open 2000m and 200m, mentored novice weightlifters in biweekly training regimen. Weightlifting (9/2012 - Present). Muay Thai (9/2019 - Present).

### **Violin** (9/2006-9/2016)

- SKULE Orchestra Concertmaster (9/2015 – 4/2016), All Nationals Honors Ensemble (2013), All Eastern Orchestra (2013), New York Conference All State Orchestra 3<sup>rd</sup> chair (2012)

### **DJ Entrepreneurship: ZhuKeeper** (11/2014-Present)

- Developed a brand via creating a social media following of 510, utilized marketing strategies to realize a net profit of over \$10000, performed for Dreams Music Festival 2019 (Toronto), Fifth Social Club, Shangri-La, Steam Whistle Brewery, and many other high profile clients, headlined for events with more than 1200 attendees.