

Curriculum Vitae

Leo Zhu

leozhu1996.github.io | leo.zhu@mail.utoronto.ca | linkedin.com/in/leozhu1996

Education

Master of Applied Science in Chemical Engineering, University of Toronto (Sep 2018 - Sep 2020)

- *Physiologically-Based Pharmacokinetic (PBPK) and Metabolism Model for Predicting Psychomotor Effects of Blood Cannabinoid and Ethanol Concentrations* (Supervised by [Dr. Radhakrishnan Mahadevan](#))
- Initiated a collaboration with mental health hospital ([Center for Addiction and Mental Health](#), Toronto) through developing Research Ethics Board approved protocols for clinically validating a computation model of the effects of tetrahydrocannabinol in humans, resulting in 2 posters, 3 oral presentations, and a manuscript currently under journal review (Computers & Chemical Engineering).
- Initiated collaboration with the [Thiele Lab at the National University of Ireland at Galway](#) (Ireland) to integrate a genome-scale model of human ethanol metabolism to a pharmacokinetic model for better predictions of metabolism, manuscript currently under journal review (PLoS Computational Biology).
- Supervised three consecutive undergraduate thesis students (Timothy Liu, William Pei, Claire Velikonja) on modelling the effects of current and alternative drug therapies for hypercholesterolemia and exploring novel dietary interventions.
- Supervised three Biomedical Engineering M. Eng students in a summer course project (BME1899).
- Awarded Student Discovery Award (\$1,500), \$15,000 from NSERC CREATE M3, and \$15,000 from Mclean Foundation.

Bachelor of Applied Science in Chemical Engineering, University of Toronto (Sep 2014 - Apr 2018)

- Graduated with Honors and a minor in Bioengineering.
- 3.78/4.0 cGPA.
- Scored 521/528 (99th percentile) on the MCAT.

Research Experience

Course Project, Polymer Chemistry, University of Toronto (Jan 2020 - Apr 2020)

- Prepared a mock grant application on the Treatment of Glioblastoma Multiforme with Doxorubicin-loaded Dual-degradation Polymers. Developed hypothesis and research aims, performed background research into therapeutic uses of focused ultrasound, blood-brain barrier permeabilization, and nano-particle self assembly. Received A+ in the course.

4th-year Capstone Project, University of Toronto (Sep 2017 - Dec 2017)

- Collaborated with a team of six 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 Technologies, University of Toronto (Sep 2017 - Dec 2017)

- Designed experiments on the Effects of Detergents on the Removal of Gold Nanoparticles from Tumor Tissue to resolve the color-changing capabilities of gold nanoparticles in confocal microscopy imaging.
- 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.

Undergraduate Researcher, University of Toronto (Apr 2016 - Aug 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).
- Practiced mice handling, tissue cryosectioning, and immunohistology for the verification of NaIO₃ models of retinal degeneration and the quantification of murine vision over a longitudinal study.
- Utilized Confocal Microscopy, Image J and ANOVA for data collection and analysis, resulting in the production of end-point retinal morphology figures for publication and presentations.
- 1 Publication (Invest. Ophthalmol. Vis. Sci. 2018;59(9):3261. 2).
- 2 presentations, awarded \$4,500 from NSERC USRA.

Undergraduate Researcher, University of Toronto (Oct 2015 - Mar 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 six 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 (Jan 2015 - Apr 2015)

- Initiated an independent research portfolio for the Assessment of King's College Circle to Improve Pedestrian Safety 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.

Publications & 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. 2018. [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]

In Progress

1. Leo Zhu, Patricia DiCiano, Bruna Brands, William Pei, Radhakrishna Mahadevan; **Physiologically-Based Pharmacokinetic Model for Personalized Predictions of Tetrahydrocannabinol Metabolism and Psychomotor Effects.** Currently under review at *Computers in Chemical Engineering.*
2. Leo Zhu, Ines Thiele, Radhakrishna Mahadevan; **Integrated Metabolic and Pharmacokinetic Model for Predictions of Ethanol Metabolism.** Currently under review at *PLoS Computational Biology.*
3. Leo Zhu, Timothy Liu, William Pei, Claire Velikonja, Radhakrishna Mahadevan; **Physiologically-Based Pharmacokinetic Model for Predicting the Impact of Diets on Hypercholesterolemia.** Manuscript in preparation.

Work Experience

MCAT Content Creator & Tutor, Med School Insiders (Oct 2020 - Present)

- Adapted scientific journal articles into AAMC-styled MCAT practice passages, created multiple-choice questions with comprehensive answer choice explanations to enhance student practice experience and review efficiency.
- Combined learning approaches from various test preparation companies (including Kaplan, Princeton Review, Exam Krackers, Altius, and Blueprint) to increase student content review speed, allowing students to take practice exams after an average of 3 weeks of studying.
- Advised students on MCAT content, assisted with schedule creation, and tailored passage strategies to individual students over 75+ hours of instruction.

MCAT Instructor, Kaplan (Dec 2017 - Present)

- Prepared six cohorts of students for the Medical College Admissions Test by utilizing the Socratic method for active engagement in the classroom, shifted to online conferencing programs (including Zoom, Adobe Connect) to teach amidst the COVID-19 quarantine.
- Coached students on the importance of time management and schedule planning to guide them in their journey towards medical school, created individualized content for tutoring sessions with students.
- Resulted in an average increase of MCAT scores of 11 points (from 490 to 501), and an instructor satisfaction rating of 9.7/10.

DJ Entrepreneurship: ZhuKeeper (Nov 2014 - Present)

- Transformed musical skills from being a 8-year violinist recognized by the National Association for Musical Education to DJing for musical outreach and building communities.
- Created a brand and gained a [social media](#) following of 510, utilized Customer Relationship Marketing strategies to realize a net profit of over \$10000 across 50+ gigs.
- Livestreams during COVID-19 quarantine gather over 1000 unique viewers.
- Performed for [Dreams Music Festival 2019](#) (Toronto), Fifth Social Club, Shangri-La Hotel, Steam Whistle Brewery, and other high profile clients, headlined for events with more than 1200 attendees.

Life Science Curriculum Developer, Top Knowledge (Aug 2019 - May 2020)

- Developed teaching curricula and accompanying study guides in accordance with current university materials (BIO120, BIO130).
- Taught weekly offline and online classes in Mandarin and utilized flipped classroom methodologies to record review videos in English, provided live support via WeChat Messenger, increased student term grades from a class average of 47% to 74%.

Teaching Assistant, University of Toronto (Sep 2018 - Apr 2020)

- Engineering Strategies and Practice (APS112/113): Guided a total of 133 students through the engineering design process, provided weekly feedback on reports and professionalism, and advised students on the semantics of engineering communication, resulting in the final presentations of 12 different projects.
- Applied Differential Equations (CHE222): Created course content for weekly tutorial sessions in Latex, hosted both online and offline teaching sessions, monitored and assisted students in solving chemical engineering-based differential equations problems in MATLAB and Microsoft Excel VBA.
- Nominated for teaching assistant award after 300+ hours over 4 terms.

Community Service

President/Social Media Coordinator, COVID-19 Recovery *(Mar 2020 - Present)*

- Advocated for using positive psychology to strengthen mental and physical health through disseminating uplifting news content surrounding the COVID-19 pandemic, managed posting schedules and cross-platform linking via [Instagram](#), [Facebook](#), and [website](#), resulting in over 50,000 unique site visitors, 800 Instagram followers, and 800 Facebook followers.
- Utilized project management strategies to assemble and lead an executive team to spread peer-reviewed scientific content via tri-lingual infographics and inform the general public on best practices.
- Received press coverage from [11Alive](#) (Atlanta), [Curiosity](#), [680 News](#) (Toronto), and [University of Toronto](#).
- Received [COVID-19 Student Engagement Award](#) (\$3,000) from the University of Toronto and initiated webinar series involving distinguished community leaders.

Greeter and Surgical Clerk Volunteer, Mount Sinai Hospital *(May 2017 - May 2018)*

- Shadowed and observed surgeries in urology with fertility and andropause directors, practiced intubation, laparoscopy, and suturing on dummies, acquired insight into surgical logistics.
- Provided peri-operative assistance for patients with refreshments and amenities, facilitated interactions for patients with mental illnesses.
- Interpreted physician-patient interactions for Mandarin-speaking families.
- Directed patients and families to desired locations efficiently and in a friendly manner, updated directories with new information, assisted patients with wheelchair transport, and assisted ward clerks with paperwork.

Kitchen Cook and Dishwasher Volunteer, St. Felix Center *(Aug 2016 - May 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 throughput by 40%, created a dishwashing system to eliminate downtime during operation, worked with peers to create over 100 meals a day under time constraints.
- Served as liaison between St. Felix Center and University of Toronto campus groups to increase community engagement during holiday seasons.

Leadership Experience

Founder, [Multidisciplinary Association of Psychedelic Studies \(Canada\) Journal Club](#) (Feb 2020 - Present)

- Spearheaded the creation of a Journal Club Committee for monthly academic discussions on the research of psychedelic substances and investigated their implications for translational medicine in psychiatry, gathering the interest of 60+ online meeting participants across Canada within 2 weeks of advertisement.
- Organized and invited guest lecturers to present their cutting edge research to the group, moderated the discussion and critique of recently published literature.
- Coordinated with industry professionals to provide insight into current practices surrounding psychedelic medicine.
- Advocated for Justice, Equity, Diversity, and Inclusion (JEDI) representation for invited talks, as well as the adoption of decolonization practices.
- Transitioned from President/Founder of the University of Toronto Psychedelic Journal Club to improve outreach and increase the scope of operations from 9 members to over 700.

Internal Communications Coordinator, [BioZone Council](#) (Jan 2019 - Dec 2020)

- Organized internal communications within the graduate department and planned monthly meetings, newsletters, and social events including the engagement of 140 attendees for annual department social.
- Planned and assisted in the execution of the annual BioZone Research Symposium within the Chemical Engineering department.
- Volunteered at the Science Rendezvous for educating 70+ primary school children on bioengineering with Health & Safety approved Biohazard Level 1 protocol for agar art.

Moderator / Manager, [Model United Nations](#) (Sep 2010 - Apr 2020)

- Moderated and designed historically-researched debate topics for Model United Nations conferences at both highschool and university levels, 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, 2020) in sessions ranging from 20 to 100 participants.

Vice President / Treasurer / Social Chair, [Sigma Chi Fraternity, Beta Omega Chapter](#) (Sep 2016 - Apr 2020)

- Pioneered a welcome event for 1200 incoming students to build a sense of community, resulting in an annual tradition.
- Executed 60+ philanthropic, social, and outreach projects by delegating a team of 11 members, received scholarship for an international week-long [leadership summit](#) on improving adaptability and emotional intelligence, increased cumulative membership by 51, social media following by 37%, and fundraised over \$6000 for the [Huntsman Cancer Institute](#).
- Transformed and built an automated digital budgeting system to improve transparency and precision, allowing for the creation of same-day reimbursements.
- Allocated and managed a budget of \$38400, completed the term with an annual budget saving of \$8770.

Founder / President, [University of Toronto Electronic Music Community](#) (Jan 2017 - Apr 2019)

- Established a community for electronic music enthusiasts across three campuses, created [social media](#) outlets to build brand name recognition, recruited membership via ticket raffles, event meet-ups, dance lessons, and DJ tutorials.
- Organized four successful music events involving the planning of logistics, designing of five different stages, and hiring 23 DJs, cumulatively engaging 44600 netizens, selling over 600 tickets to collect over \$2780 in reinvested profits and \$415 donated to Covenant House Toronto to assist underprivileged youth, ultimately growing the club to 615 members.

Orientation Package Chair / Outreach Chair, University of Toronto Engineering Society (Mar 2015 - Sep 2016)

- Managed a budget of \$55000 for the creation of welcome packages for incoming students, negotiated with five different suppliers for cost optimization, organized and created distribution logistics involving the recruitment of 25 volunteers, 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% compared to previous years.
- Consolidated a list of 115 companies to generate sponsorship revenue for incoming student orientation week, communicated with six internal subcommittees to allocate sponsorship deals, resulting in doubling the numbers of sponsors from the previous year and an additional \$2000 added to the overall orientation week budget.

Awards

Student Discovery Award (Sep 2020) - University of Toronto, \$1500

COVID-19 Student Engagement Award (June 2020) - University of Toronto, \$3000

McLean Foundation Graduate Scholarships (Sep 2019) - McLean Foundation, \$15000

Highest GPA Award (Apr 2019) - Sigma Chi Fraternity, \$1000

NSERC Create M3 (Sep 2018) - NSERC, \$15000

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

Best Plant Design Process Engineering (Mar 2018) - University of Toronto

Horizons Leadership Development Scholarship (Jul 2017) - Sigma Chi Fraternity, \$2700

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

NSERC Undergraduate Student Research Awards (May 2016) - NSERC, \$4500

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

Other Interests & Experiences

French

- 4 years' of secondary school experience, currently learning

League of Legends: Teamfight Tactics Grandmaster (Dec 2020 - Present)

- Ranked top 0.06% of all players in North American server

Muay Thai (Sep 2019 - Present)

Weightlifting (Sep 2012 - Present)

Private Tutor (Sep 2019 - Present)

Independent Contractor (May 2018 - Sep 2018)

Host and Food Handler, Fifth Social Club (May 2018 - Jul 2018)

New Dragons Dragon Boat Team (Sep 2016 - Jul 2018)

- Placed 2nd place internationally at the [2018 Club Crew World Championships](#) in Szeged, Hungary for the U24 open 2000m, 2nd place U24 200m, 3rd place for U24 mixed 2000m, 4th place for University mixed 2000m.
- Mentored novice weightlifters and new recruits in biweekly weight-training regimen.

Violin (Sep 2006 - Sep 2016)

- SKULE Orchestra Concertmaster (Sep 2015 - Apr 2016), participated at NAFME All National Honors Ensemble (2013), All Eastern Orchestra (2013), New York Conference All State Orchestra 3rd chair (2012).

Campus Ambassador, One Class (Feb 2016 - Jun 2016)

Line Chef, Burger King (Aug 2013 - Oct 2013)

Track & Field (Sep 2011 - Apr 2014)

- Placed 3rd place in New York State Qualifiers in Triple Jump.
- Records can be found on [NY Milesplit](#).

Updated Apr 1, 2021

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