

Sanchit Chopra, BSc. Chemical and Biomedical Engineering**Graduate Student (Master of Applied Science)**

School of Biomedical Engineering

Faculty of Applied Science | Faculty of Medicine

The University of British Columbia

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AREAS OF EXPERTISE

Synthetic Biology / Genome Editing / Systems Biology / Biomanufacturing

MAJOR AWARDS & FELLOWSHIPS

Sep 2022-To date	Graduate NSERC CGS-M Fellowship (\$17,500) National Sciences and Engineering Research Council of Canada (NSERC)
Sep 2019	Cannon Lachapelle Scholarship (\$10,000) Schulich School of Engineering, University of Calgary
Sep 2017-May 2021	Seymour Schulich Scholarship (\$37,200) Schulich School of Engineering, University of Calgary

EDUCATION

Sep 2022-Present	The University of British Columbia <u>Master of Applied Science (MAsc.) in Biomedical Engineering</u> School of Biomedical Engineering, Faculty of Applied Science and Faculty of Medicine
Sep 2022-Present	The University of Calgary <u>BSc., Chemical Engineering</u> , specialization in Biomedical Engineering, minor in Entrepreneurship and Enterprise Development, <i>with distinction</i> , Faculty of Engineering

RESEARCH EXPERIENCE

Sep 2022-Present	<u>Graduate Student, Yachie Laboratory</u> , <i>University of British Columbia</i> <ul style="list-style-type: none">Developing molecular biology-based technologies to capture and record cellular events, such as miRNA and mRNA expressions using CRISPR based tools such as base editing and prime editing.
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- Mentoring final year undergraduate student and their independent research project in the biomedical engineering department.
- Sep 2021-Aug 2022 **Undergraduate Researcher, Billon Laboratory, Biochemistry & Molecular Biology, University of Calgary**
- Investigating the role of DNA repair machinery to improve the efficiency of genome editing technologies with a specific focus on CRISPR-Base Editing and CRISPR-Prime Editing.
 - Independently designed gRNAs/pegRNAs/epegRNAs, cloning experience via ligation and bacterial transformation, PCR, gel electrophoresis, plasmid purification, transfection into mammalian cells, analyzed Sanger sequencing data, analyzed edited cells using FACS.
 - Other technical skills: Cloning using Gibson Assembly, DTECT (marker free detection of genome editing), developed a predicting prime editing efficiency script using R.
- May 2019-Nov 2019 **Undergraduate Researcher, Kallos Laboratory, Biomedical Engineering, University of Calgary**
- Designed and performed experiments for the large-scale production of human nerve and skin derived Schwann cells required at a clinical scale.
 - Cultured cell lines in static and stirred suspension bioreactors, marker staining and harvesting.
 - Optimizing growth factors including feeding, agitation, and seeding densities resulting in a 16+ fold expansion with optimized bioprocess using bioreactors
- May 2018-Aug 2018 **Undergraduate Researcher, Ramasubbu Laboratory / Mathison Centre for Mental Health Research & Education, University of Calgary**
- Developed a linear mixed model analysis of longitudinal repeated mixed measures (SPSS) pipeline to analyze deep brain stimulation data, administered Transcranial Magnetic Stimulation (TMS) (visor2 XT), electroencephalography setup and processing (MATLAB), MRI Level 1 Training, Data analysis (R/MATLAB/SPSS/Excel)
- Sep 2016-Sep 2017 **Student Researcher (Highschool), Ungrin Laboratory, Comparative Biology & Experimental Medicine, University of Calgary**
- Used CRISPR/Cas9 technology to model FSHD in HEK293 cells.
 - Synthesizing genetically engineered elements (guideRNAs), nucleofection protocols, gel electrophoresis, cell culture, marker staining, quantitative PCR
 - Presented findings at McCaig Institute Summer Student Symposium Alberta Sanofi Biogenius Competition - Top 5 & best senior project/gold medal from Genome Alberta
- Sep 2016-Sep 2017 **Student Researcher (Highschool), Kutz Laboratory, Veterinary Medicine, University of Calgary**
- Examining the dental health of declining muskox and caribou populations
 - Worked at the Spy-Hill facilities where Muskox jaw surgeries, dental health analysis (incisor breakage, molar wear pattern, enamel defect, soft tissue and bone abnormalities) were conducted.

- Working with hunters and guides of Cambridge Bay and Kugluktuk for muskox jaw samples

INDUSTRY EXPERIENCE

May 2020-Sep 2021 **Process Engineer, NOVA Chemicals, Internship**

- Assisting process engineering in manufacturing infrastructure focusing on demineralization, clarification, co-gen, and river water systems.
- Developed a mathematical model for a settling pond to predict total organic carbon that provided insight into seasonality changes and ideal dosage rates of coagulant.
- Studied high turbidity in the phosphate removal system by correlating ASPEN process data to inventory data and provided recommendations to reduce chemical usage and shift turbidity within spec.
- Targeted cause of early regeneration in demineralization system.
- Developed a PowerBI Dashboard for visual management of site-wide cost data for leadership.
- Developed Excel dashboards for visual management of participation/financial data for daily shift-team meetings.

VOLUNTEER EXPERIENCE

Jan 2019-Oct 2019 **Program Developer, Hunter Hub, University of Calgary**

- Helping to shape the entrepreneurial ecosystem within the University of Calgary. Hosting social innovation events, chats, and building experiences centered around interdisciplinary work.

Mar 2016-Jan 2020 **Friendly Visiting Volunteer, MS Society of Canada**

- Meet with an individual who has progressive MS, and other significant setbacks, including cognitive impairment and severe depression. Responsibilities include to assist with emotional distress caused by the disease as well as initiate conversations to provide them with an individual they can rely on. Additionally assist with fundraising events, including The Hike for MS.

Sep 2015-Oct 2020 **Neuro-Rehab Volunteer, Foothills Medical Center, AHS**

- Volunteer at Alberta Health Services on Unit 58 in Foothills Medical Center. I am responsible for assisting, interacting, and enriching the experience of patients admitted into the Neurological Rehabilitation Unit at Calgary's Foothills Hospital. I have dedicated a 3-hour shift every Tuesday since September 2015 to interact and help the patients recover from traumatic injuries.

AWARDS/RECOGNITIONS/FELLOWSHIPS

Oct 2022 **First Place - Zeton Plant Design Competition**

\$1,000, Canadian Society for Chemical Engineering/Zeton

Sep 2022-To date **NSERC Canada Graduate Scholarship - Master's Award**

\$17,500, National Sciences and Engineering Research Council of Canada

May 2022 **First Place – Engineering Capstone Project Presentations**

University of Calgary, Schulich School of Engineering

May 2022 **Dean's List – Chemical Engineering**

University of Calgary, Schulich School of Engineering

Sep 2017-May 2021	Seymour Schulich Community Service/Entrepreneurship Award \$37,200, University of Calgary, Schulich School of Engineering
May 2020	Jason Lang Scholarship for Academic Excellence \$1,000, Government of Alberta
Apr 2020	Dean's List – Chemical Engineering University of Calgary, Schulich School of Engineering
Aug 2019	Cannon Lachapelle Award in Entrepreneurial Thinking \$10,000, University of Calgary
Aug 2019	Students' Union Undergraduate Research Symposium Research Award \$1,000, University of Calgary
May 2019	Jason Lang Scholarship for Academic Excellence \$1,000, Government of Alberta
May 2019	Biomedical Engineering Undergraduate Research Funding \$6,000, University of Calgary, Schulich School of Engineering
Nov 2018	NEXT 36 Finalist \$2,000, NEXT Canada
May 2018	Mathison Centre Undergraduate Research Funding \$6,000, Mathison Centre for Mental Health Research and Education
May 2018	Jason Lang Scholarship for Academic Excellence \$1,000, Government of Alberta
May 2017	2017 Great Kid Award \$2,000, Government of Alberta
Apr 2017	Genome Alberta Senior Award (Poster) \$1,000, Genome Alberta/University of Calgary
Apr 2017	Alberta Sanofi Biogenius Competition Top 5 \$500, Sanofi
Jul 2016	Heritage Youth Researcher Summer Program (HYRS) \$2,500, University of Calgary & Alberta Innovates Health Solutions
Jun 2016	Research and Development Grant (personal project) \$1,500, Southern Alberta Institute of Technology
May 2016	Renewable Energy Fair First Place \$750, Green Calgary
< May 2016	Calgary Science Fair (3 gold medals, 2 silver, 1 bronze, Merson Family Award, HoangMayer Renewable Energy Award, APEGA science fair award, virtual science fair awards), \$5,000 Calgary Youth Science Fair

PEER REVIEWED PUBLICATIONS

1. Ramasubbu, R., McAusland, L., **Chopra, S.**, Clark, D. L., Bewernick, B. H., & Kiss, Z. H. T. (2021). Personality changes with subcallosal cingulate deep brain stimulation in patients with treatment-resistant depression. *Journal of Psychiatry & Neuroscience: JPN*, 46(4), E490–E499. <https://doi.org/10.1503/jpn.210028>

CONFERENCE PUBLICATIONS

1. McAusland, L., **Chopra, S.**, Brown, E., Kiss, Z., & Ramasubbu, R. (2019). S106. Personality changes in subcallosal cingulate deep brain stimulation for treatment resistant depression. *Biological Psychiatry*, 85(10). <https://doi.org/10.1016/j.biopsych.2019.03.857>

SEMINAR AND CONFERENCE PRESENTATIONS

1. **Sanchit Chopra**, Breanna Borys, Erin Roberts, Tylor Walsh, Tak Ho Chu, Rajiv Midha, and Michael S. Kallos (2019), “Bioprocess Pilot for the Large-Scale Expansion of Human Schwann Cells”, **Students Union Research Symposium**, Calgary, Canada, November 26. (Poster)
2. **Sanchit Chopra**, Breanna Borys, Erin Roberts, Tylor Walsh, Tak Ho Chu, Rajiv Midha, and Michael S. Kallos (2019), “Bioprocess Pilot for the Large-Scale Expansion of Human Schwann Cells”, **Alberta Biomedical Engineering Conference**, Banff, Canada, October 25-27. (Poster)
3. **Sanchit Chopra**, Breanna Borys, Erin Roberts, Tylor Walsh, Tak Ho Chu, Rajiv Midha, and Michael S. Kallos (2019), “Bioprocess Pilot for the Large-Scale Expansion of Human Schwann Cells”, **Annual Biomedical Engineering Society Conference**, Philadelphia, USA, October 16-19. (Podium), International Oral Presentation.
4. **Sanchit Chopra**, Breanna Borys, Erin Roberts, Tylor Walsh, Tak Ho Chu, Rajiv Midha, and Michael S. Kallos (2019), “Bioprocess Pilot for the Large-Scale Expansion of Human Schwann Cells”, **Hotchkiss Brain Institute Summer Student Symposium**, Calgary, Canada, August 21. (Poster)
5. **Sanchit Chopra**, Breanna Borys, Erin Roberts, Tylor Walsh, Tak Ho Chu, Rajiv Midha, and Michael S. Kallos (2019), “Bioprocess Pilot for the Large-Scale Expansion of Human Schwann Cells” **Biomedical Engineering Summer Student Symposium**, Calgary, Alberta, August 19. (Podium)
6. **Sanchit Chopra**, Laina McAusland, Eliot Brown, Rajamannar Ramasubbu (2018), “Personality changes with subcallosal cingulate deep brain stimulation in patients with treatment- resistant depression. **Hotchkiss Brain Institute Summer Student Symposium**, Calgary, Alberta, August 2018. (Poster)
7. **Sanchit Chopra**, Derek Toms, Mark Ungrin (2017), “Using CRISPR/Cas9 Technology to Model Facioscapulohumeral Muscular Dystrophy” **McCaig Summer Student Symposium**, Calgary, Alberta, August 2017 (Podium).

EXPERIMENT AND RESEARCH SKILLS

Molecular cloning

- At least 5 years of experience.
- Including: Gibson assembly, golden gate assembly, and digestion-and-ligation based cloning
- Designed and constructed over 300 plasmids (CRISPR-based, piggybac, lenti-viral, reporter, DNA barcodes etc)

Other molecular biology laboratory experiments

- PCR, Quantitative Real-Time PCR
- RNA and DNA extraction
- Library preparation for NGS

Mammalian cell culture experiments

- At least 5 years of experience
- Including: transfection, transduction, flow cytometry, fluorescent microscopy, and high throughput assays of genome editing efficiencies using HEK293/HeLa/HAP1/k562 cells
- Bioreactor operation

Computational analysis skills

- At least 2 years of experience in Python scripting, 1 year of experience in R scripting
- Including: analyzing reads from NGS, analyzing flow cytometry data, developing analysis pipelines for single cell RNA-seq and barcoded libraries.

PEER REVIEWER PARTICIPATION

Working alongside my graduate school supervisor (Dr. Nozomu Yachie) to aid in the peer review of manuscripts submitted to the following journals: **Nature** (1) **Nature Communications** (1).

OTHER ACTIVITIES, LEADERSHIP & MENTORSHIP

Entrepreneurial Activities

Founder: stores24x7.com

- Custom website development for local businesses. Developed over 15 websites for clients across Canada and maintaining/updating them.

Founder: ClubCanada – Amazon Seller

- Assisting multiple different verified Amazon sellers achieve growth in their business. Contributing to develop webpages, product description videos, spreadsheets to track product cost and targeted ads. Working with distributors worldwide to bring their products on Amazon.

Founder: HelpAKid.org

- Increasing transparency of donations worldwide by building a crowdsourced platform (active).

Knowledge and Technology Translation

Developing a feasibility analysis for an on-site childcare facility in an Alberta Health Services facility.

- Consulting project with the Cumming School of Medicine's Office of Professionalism, Equity, and Diversity. Developed a user-centered business case for a revenue-generating, on-site childcare facility, operated through the lens of a social enterprise. This included a feasibility analysis and financial analysis. Report was sent to AHS and CMS leaders.