cjg276@cornell.edu

CELESTE GROUX

EDUCATION

PhD; Operations Research and Information Engineering Fall 2023 – Present
Cornell University – Ithaca, NY, USA GPA: 3.94/4.0
Advisors: Shane Henderson, David Shmoys, and Andrea Lodi

Bachelor of Science; Honours Applied Mathematics / Minor Computer Science Fall 2019 – Fall 2022
McGill University – Montreal, QC, Canada GPA: 3.82/4.0

DEC; Pure and Applied Science Fall 2017 – Spring 2019
Graduated with Dean's Honours from First Choice Science (Enriched Science) R Score: 37.9/38.0
Dawson College – Montreal, QC, Canada

WORK EXPERIENCE

Graduate Student Researcher May 2024 – Present
Cornell University – Ithaca, NY, USA / PopWheels – New York, NY, USA
- Conduct applied operations research in collaboration with NYC startup PopWheels to support operational decision-making for an e-bike battery-swapping system.
- Develop stochastic and optimization-based models to analyze service capacity, reliability, and resource allocation.
- Design and implement simulation frameworks to evaluate operational policies and quantify performance trade-offs.
- Meet regularly with company stakeholders to align models with evolving operational constraints and decision priorities.
- Translate modeling results into actionable recommendations to inform system design and operational strategy.

Teaching Assistant January 2024 – May 2024
College of Engineering, Cornell University – Ithaca, NY
- Led 3 weekly recitation sections emphasizing conceptual understanding and problem-solving strategies.
- Designed concise lecture recaps and facilitated interactive in-class practice.
- Recognized in student evaluations for clarity, approachability, and supportive instruction.
- Responsibilities also included grading assignments and exams as well as holding weekly office hours.

Performance Measurement Analyst May 2023 – August 2023
Canadian National Railway (CN) – Montreal, QC
- Supported IT service performance analysis within the Service Performance Operations team.
- Met with stakeholders to understand an IT process and propose KPI-driven updates to improve efficiency and data collection.
- Designed and presented a Power BI dashboard to track process performance, incorporating feedback from senior leadership.
- Contributed to the design of ServiceNow dashboards by prioritizing key information and effective visual presentation.

Undergraduate Research Assistant – DAAD RISE & Mitacs Globalink May 2022 – August 2022
Technische Hochschule Ingolstadt, Learning and Optimization in Manufacturing Lab – Ingolstadt, Germany
- Awarded Mitacs scholarship for competitive DAAD RISE program from pool of 1365 applicants and 320 acceptances
- Analysis of combinatorial optimization strategy using computational social choice theory
- Developed Copeland and Pareto constraints in modelling software MiniZinc
- Formed iterative search algorithm in python integrating MiniZinc Copeland scores and Pareto constraints

Undergraduate Research Assistant – NSERC USRA Award May 2021 – August 2021
McGill University, Faculty of Management, Operations Management Area – Montreal, QC
- Analysis of Montreal Ville Marie parking data using python as part of project to minimize social costs of parking
- Developed 2 step method that reduced error for parking occupancy prediction using time series clustering and neural networks
- Tested model updating strategies from research papers such as weighted ensemble learning and replacement
- Updated Bokeh interactive visualization to include new methodology and added confidence interval data table

Cloud Operations and Infrastructure Intern May – August 2020
TC Energy – Calgary, AB
- Patched, resized, tagged, added disk space for virtual servers in AWS, Nutanix, and VCenter
- Improved the server patching process with PowerShell scripts and SCCM, leading to over $8000/year savings
- Lead Active Directory Audit project to improve security and replaced user accounts in over 800 server groups
- Resolved 69 tickets in 3 months while working remotely

Office Clerk January – August 2019

Canada Revenue Agency – Montreal, QC

- Organized data using Excel to extract useful information for the Income Tax Assistance – Volunteer Program
- Translated documents from French to English while respecting deadlines
- Assisted team members in contacting volunteers, arranging promotional material, and event organization

Project Lead Material Property Inventory June 2018 – January 2019

Canada Revenue Agency – Montreal, QC

- Established an inventory and optimized the inventory process for over 5000 office furniture items
- Quickly learned to use data base software Access and P-touch Editor
- Wrote a comprehensive guide detailing optimal method found using creative shortcuts

PROJECTS

- **Customer Allocation in PopWheels Swapping Networks (Python, Simulation)**
  - Formulated a service network model with home-station and roaming customer demand to study service availability.
  - Built a discrete-event simulation in Python to capture demand dynamics and customer flows.
  - Developed an iterative greedy allocation method within a simulation-optimization framework.
  - Demonstrated improved performance over baseline allocation policies through extensive simulation experiments.
- **Pricing Shared Rechargeable Resources Over Time (Python)**
  - Studied incentive design to encourage customers to spread demand over time and reduce peak congestion.
  - Modeled a battery-swapping service with rechargeable resources and time-varying customer value.
  - Used simulation to compute pricing policies that maximize social welfare and revenue.
  - Analyzed how demand patterns, prices, and system performance interact across parameter settings.
- **Geographic Partisan Swing Models (Python)**
  - Developed models of partisan swing that incorporate spatial structure beyond uniform swing assumptions.
  - Compared diffusion-based, spatial averaging, and regression approaches using precinct-level election data.
  - Demonstrated strong spatial correlation in voting shifts, highlighting limitations of uniform swing models.
- **Capacity Planning for Battery-Swapping Systems (Python)**
  - Studied customer capacity planning for a shared e-bike battery-swapping system under uncertain demand.
  - Designed a simulation model linking customer volume, charging capacity, and service availability.
  - Developed risk-aware capacity recommendations to ensure reliable access to charged batteries.
- **Choice Modelling for Slot Machine Optimization (Python, R)**
  - Implemented and compared discrete choice models for casino slot machine selection using real operational data.
  - Estimated MNL, nested logit, and Markov chain choice models based on machine attributes and location.
  - Analyzed implications for assortment design and revenue optimization.
- **Exploration of Challenges and Methods in Online Controlled Experiments (A/B Testing)**
  - Conducted a structured literature review on causal inference methods for large-scale online controlled experiments.
  - Analyzed key challenges in A/B testing, including detecting small and long-term treatment effects.
  - Reviewed methods for inference under network and market interference beyond standard independence assumptions.
  - Synthesized practical strategies and open research questions relevant to experimentation in online platforms.
- **Improving Messaging in Temporal Graph Neural Network Algorithm** (Python)
  - Research paper on improving TGN algorithm introduced by Rossi et al. (2020) for dynamic network link prediction
  - Tested improvements to the message function, particularly to share messages to a node's neighbourhood
  - Analyzed results on bipartite Wikipedia page editing data and unipartite MIT dorm student interaction data
  - 1st place in Western University IDSTEM Conference 2022 Poster Competition (Category: Math/Comp/Engineering)
- **Analysis of Travel Time to Churches in the Montreal Area Considering Language Preference** (ArcGIS, Excel)
  - Explored change in average travel time in various location reallocation scenarios for members of the LDS Church
  - Compared proximity-based and language-aware reassignment strategies, including adding or removing congregations.
  - Evaluated impacts on congregation statistics and presented results to regional leadership.
- **Dependence and Depression Levels in Residential Care Residents Throughout Canada** (R, Excel)
  - Undergraduate Big Data Competition (2020) Manuscript analysing Canadian Residential Care Data from 2016-2019
  - Abstract published in STEM Fellowship Journal
- **A Visual Network of Required Courses to Help Students Plan their Degree** (Python, Graphviz, Beautiful Soup, Requests)
  - This code scraped information about a program's required courses, pre-requisites, and co-requisites from the McGill website, organized that data into a graph structure, and then visualized the ordered network

Programming & Software: Python, R, Java, Amazon Web Services, Windows PowerShell, ArcGIS, MS Access, Service Now, SQL

Computer Science: Algorithms and Data Structures, ML, Geometric Data Analysis, Network Science, AI, Software Systems

Math: (Honours Level) Algebra, Analysis, Calculus, Graph Theory, Probability, Statistics, ODEs, PDEs, Non-Linear Dynamics; Complex Variables, Linear Optimization, Stochastic Processes, Numerical Analysis, Regression, Reinforcement Learning

PhD Coursework: Mathematical Programming 1, Applied Stochastic Processes, Statistical Principles, Information Design in Networks, Optimization for Revenue Management, Causal Inference, Algorithmic Game Theory, Berstein Seminar in Topology (Voting, Social Choice, and Gerrymandering), Engineering Societal Systems, Robust and Stochastic Optimization, Transportation Systems and Networks, Simulation.

TALKS AND PRESENTATIONS

- Modelling an NYC E-Bike Battery Swapping Service. Poster presentation, Young Researchers Workshop, Cornell University, Ithaca, NY, 2025.
- Managing Operations in an NYC Electric Bike Battery Swapping Service. Poster presentation, NYC Operations Day, New York University, New York, NY, 2025.
- Managing Operations in an NYC Electric Bike Battery Swapping Service. Oral presentation (10-minute talk), NYC Operations Day Graduate Colloquium, New York University, New York, NY, 2025.
- Improving Temporal Graph Network Messaging. Poster presentation, INFORMS Annual Meeting, Indianapolis, IN, 2022.
- Graph Representation Learning. Research presentation, AISES in Canada Gathering, Vancouver, Canada, 2021.

Community & Leadership Presentations

- Indigenous Futures. Presentation at the AISES Leadership Summit, Temecula, CA, 2022.

Upcoming

- Modelling an NYC E-Bike Battery Swapping Service. Presentation (planned), AISES in Canada Conference, Toronto, Canada, March 2026.

AWARDS

- **NSERC PGS-D Fellowship**   Sept 2024 – August 2027
  Competitive national doctoral fellowship awarded to support outstanding research excellence and potential in science and engineering. Awarded $40,000 per year for three years.
- **Graduate Dean's Scholar Distinction**   Sept 2023
  Institutional distinction recognizing academic excellence and leadership potential aligned with Cornell's commitment to building an inclusive graduate community.
- **Hydro Quebec Science Award**   Sept 2019 - April 2022
  A major entrance scholarship to McGill University of $5000, renewable for 2 years, to support outstanding Quebec students pursuing a Bachelor of Science. Awarded a total of $15,000.
- **RBC Indigenous Student Award - The Corinne Mount Pleasant-Jetté Leadership Award**   Sept 2019 - April 2022
  A national award valued at $4000, renewable for 3 years, given to 10 indigenous students from across Canada. "The Corinne Mount Pleasant-Jetté Leadership Award" is given as a special distinction to one of the 10 students "who demonstrates leadership skills in their community and acts as a change agent for Indigenous communities." Awarded a total of $12,000.
- **TC Energy Indigenous Legacy Award**   Summer 2021
  $5000 award to support indigenous students pursuing post-secondary education.
- **The IPEX Women's STEM Scholarship**   Summer 2021
  $3500 scholarship for a female student passionate about pursuing a career in STEM-related field.
- **Chapeau les Filles – Prix Équité**   Fall 2020
  $2000 awarded by the Fédération des travailleurs et travailleuses du Québec to female undergraduate student.
- **Indigenous Student Entrance Award**   Fall 2019
  $2000 awarded by McGill University in partnership with Indspire to new incoming post-secondary student.
- **Science Communication Award at Dawson Science Fest**   April 2019
  Gave a 30 minute talk on Random Number Generators and their various applications.
- **Top 35 out of 200+ in 2019 AMQ Math Competition**   May 2019
  (Association mathématique du Québec) Selected to attend the AMQ Collegial Math Camp.

LEADERSHIP

President / Cornell Indigenous Graduate Student Association   June 2025 – May 2026
- Led a graduate student organization focused on community-building and peer support for Indigenous graduate students.
- Managed a 4-member executive board and $2k annual budget.

- Oversaw biweekly programming, including event planning, communications, and coordination with executive board members.
- Led preparation of a major grant proposal ($50k) for a campus pow wow, coordinating planning and application materials.
- Represented IGSA in collaborations with campus Indigenous organizations and student leadership groups.
- Improved organizational operations by formalizing shared communications and organizing shared documentation.

URM Application Support Program Officer / Operations Research Graduate Association   May 2024 – June 2025
- Match the PhD student volunteers and underrepresented minority student application support requests
- Advertise the program across various channels to increase visibility
- Check in to ensure PhD students and prospective students are meeting and getting support
- Main slack channel for additional questions the students might have regarding the program and their PhD application

PhD Visit Day Student Coordinator / Operations Research Graduate Association   May 2024 – June 2025
- Help coordinate the organization of the prospective ORIE PhD students weekend at the Cornell Ithaca campus

Canadian National Student Representative / American Indian Science and Engineering Society   June 2020 – June 2022
- Acted as primary student ambassador of the organization
- Attending events to speak about the mission, goals and objectives of AISES programs, activities and events, with corporations, federal agencies, tribal entities and other organizations
- Started 'AISES in Canada Student Chats' Series to encourage student connection during pandemic
- Supported universities and students in starting their own AISES Chapters in Canada
- Volunteered in organization of AISES National US and Canadian Conferences
- Shared Canadian student perspective as member of the Board of Directors and Canadian Indigenous Advisory Council

Junior Co – Chair / McGill Student Chapter of AISES   September 2020 – Present
- Reminded student members of activities, events, and opportunities
- Helped organize volunteer and outreach activities

Student Council Member / Montreal LDS Institute of Religion   January 2018 – July 2021
- Helped organize weekly scripture study program, free supper, and evening activities
- Lead food and registration committees for interprovincial annual winter conference for approximately 250 young adults
- Improved young adult participation to highest in several years

VP Communications / American Indian Science and Engineering Society   October 2019 – April 2020
- Managed Facebook page and prepared indigenous and STEM related content to share
- Started Instagram page and grew to 100 followers

LDS Student Representative / McGill University   September 2019 – April 2020
- Served as Latter Day Saint Student Representative for McGill Office of Religious and Spiritual Life council
- Volunteered and helped organize the McGill Interfaith Fair and other campus interfaith events

COMMUNITY ENGAGEMENT & MENTORSHIP

- **Pick Your Path: Indigenous Post-Secondary Student Mentor** (Summer 2021, Fall 2022 – Winter 2023)
  Mentored Indigenous students on post-secondary pathways and academic planning.
- **Kahnawake Survival School Volunteer** (2019-2022)
  Supported science fair mentoring and judging, and led design-cycle workshops.

ACTIVITIES

- **McGill Summer School in Health Data Analytics** – June 2021
  - Some topics included are Correlated Data Models; Bayesian Inference with Markov Chain Monte Carlo; High Dimensional Data Analysis Using Penalized Regression Methods; Bayesian Adaptive Design for Clinical Trials; and Bayesian Disease Mapping
- **Artificial Intelligence and Operations Research 2-Week Crash Course** (University of Toronto ORG) - October 2020
  - Data Prep and Machine Learning in Python with Scikit-Learn, RL, Operations Research with Gurobi in Python
- **Hackathons: Undergraduate Big Data Competition** (June 2020), **McHacks at McGill** (Feb 2020)
- **Math Competitions**: Euclid 2018, COMC 2018, Waterloo Senior Math Comp. 2018 (top 25%), AMQ 2019 (top 20%)"

ENTREPRENEURSHIP

Wasko Beadwork — Independent beadwork business (2020–2022)

AFFILIATIONS

Sequoyah Fellow (Lifetime Member) – American Indian Science and Engineering Society
Student Member – Institute for Operations Research and the Management Sciences
Student Member – Canadian Mathematical Society