

UNDERGRADUATE BIG DATA CHALLENGE 2019

BIG DATA of RECREATIONAL DRUGS

An exploration through pharmacometric, public health and socioeconomic lenses

Organized by [STEM Fellowship](#) in partnership with
[Roche](#), [University of Calgary Hunter Hub](#), [SAS](#), [Canadian Science Publishing](#), [Digital Science](#), [Overleaf](#) and
[Altmetric](#)

The Big Data Challenge (BDC) for undergraduate students is a unique inquiry-driven and experiential learning program that invites students from across the country to strengthen their analytical and inquiry skills while gaining familiarity with the fundamentals of data science. Teams of up to 4 students each are provided with data sets, tools for data analysis, as well as the general topic or overarching goal. Teams then undertake exploratory data analysis or test a hypothesis about their data with the guidance of mentors from industry and academia. At the end of the competition, teams submit a research paper and present their findings to a panel of industry and academic experts in the field.

The BDC offers top teams of students the highly sought-after opportunity to develop their data analytics abilities and present their findings to professionals and to the expert community. All Challenge participants will have their research paper abstracts published in the Open Access, peer-reviewed [STEM Fellowship Journal](#), published by Canadian Science Publishing. Full manuscripts of winning teams will be published in the STEM Fellowship Journal. Challenge winners will be recognized with monetary prizes and may have the opportunity to intern with corporate sponsors of the Challenge. By enabling students of diverse backgrounds to collaboratively explore the relationships between recreational drug use, society, the economy, and human health, our challenge will spark novel discussion and prompt consideration of relevant strategies and solutions at both the individual and population level.

INTRODUCTION TO PHARMACOMETRICS AND PHARMACODYNAMICS

Check out these links to better understand what pharmacometrics and pharmacodynamics are and the differences between the two:

- [Pharmacometrics and pharmacodynamics- Medicine and the body](#)
- [Introduction to Pharmacometrics and Pharmacodynamics](#)
- [Principles of Pharmacokinetics](#)

PROBLEM STATEMENT

This year's competition will encourage undergraduate students to explore a computer-based approach to the pharmacokinetics and pharmacodynamics of recreational drugs, and quantify their xenobiotic effects as well as the impact exerted by these drugs on human health and on society. The



challenge will be based on the analysis of open data from [Health Canada](#), [United Nations Office on Drugs and Crime](#), [Drug Bank](#), the [National Cancer Institute](#), [Google Data Search](#), and other open data sources identified by students.

Through this challenge, students will:

- Collect and analyse data pertaining to recreational drugs at the biological, chemical and societal levels.
- Gain insight into the use of pharmacometric models to quantify the interactions between drugs and human patients.
- Characterise, understand and predict the individual health, public health, and socioeconomic implications of recreational drug use.
- Explore human health and wellbeing issues (physical health, public health, mental health, etc.) in the context of local, regional and global clinical and public health
- Identify and suggest safe consumption, production and selling strategies, and policies to prevent or decrease the harmful consequences of xenobiotics on the health of individuals and society.

Join the BDC to...

- Obtain exposure to pharmacometric and public health research
- Learn the vital computation skills required for working with large amounts of data
- Enhance your problem-solving and inquiry skills by engaging in an interdisciplinary student-driven learning environment
- Explore the realm of bioinformatics and pharmacometrics
- Acquire the opportunity to have your research published in a peer-reviewed journal
- Network with academic and industry experts and other like-minded students
- Note: undergraduate students from all majors and programs are welcome to participate and there is no minimum GPA required

Prize Descriptions

- **Scholarly publication** of all project abstracts and full manuscripts of winning projects in *STEM Fellowship Journal*, published by NRC Research Press
- **Monetary prizes**
 - \$1000 Roche prize 1- Toronto
 - \$1000 Roche prize 1- Calgary
 - \$1000 Roche prize 2- Toronto
 - \$1000 Roche prize 2- Calgary
 - \$1000 Schulich Award - Toronto
 - Two **\$1500** Hunter Hub Entrepreneurship and Innovation Awards- University of Calgary students onlyThe Hunter Hub will work with the winners to advance their ideas into a venture focused upon public policy innovation using big data, and connect them to city stakeholders.



SCHEDULE

March 10, 2019	Challenge announced and rules are posted. Challenge invitation is circulated through STEM Fellowship university branches and among undergraduate STEM students across Canada.
March 15th, 2019	Challenge registration opens (students respond to Eventbrite form, provide a topic or problem statement they would like to focus on) Registration link
March 26, 2019	Orientation Session held at UCalgary Calgary Orientation Session
May 13th, 2019	Competition start date
May 23rd, 2019	Deadline for report submission
Week of June 10th, 2019	Announcement of finalists, following assessment of reports by PhD reviewers
June 26th, 2019	Big Data Day Teams' 10-minute presentations and competition. Teams gather for presentation and defense. Open roundtable discussion on Future of Data Science and Analytics Careers. Judges vote nominate the best projects.

Note: During the registration period, students can form teams and begin to prepare for the challenge. Students will have access to workshops, in the form Jupyter notebooks, and resources that introduce students to computational data analysis, visual analytics with Tableau, block programming and coding with R, Python and SAS. Students are free to begin work on their project anytime before May 13. The official challenge will last from May 13 to 23rd. Students will take this opportunity to complete their research, finalise their analyses and prepare their reports.

