

2020-2021 - NATIONAL HIGH SCHOOL BIG DATA CHALLENGE

***Using the Power of Open Data to Learn: Paving the Path  
to True Equality and Equal Access in Education***  
***Bring your findings into the class, to your peers, and into the community at large***

Organized by STEM Fellowship under the patronage of Canadian Commission for UNESCO



The Big Data Challenge (BDC) for high school students is an inquiry-based, interdisciplinary, experiential learning program that strengthens students' problem-solving and critical thinking abilities by working with Open Data. By allowing students to undertake independent research projects that tackle real-world problems, the BDC synergizes with both classroom and extracurricular experiences to foster an active digital citizenship position and prompt new sustainable development innovative ideas.

It is through educational systems that some of the brightest minds and innovators are found. However, education and access to it are not uniform. Gender, race, geographical region, socioeconomic status, and citizenship status are all significant, nuanced factors in this discussion. We challenge students to examine Open Data related to their learning experiences, and to bring their results to their teachers, classrooms, and peers.

Teams of up to 4 students will be provided with datasets, workshops, learning resources, and tools for data analysis. With the help of experts from academia and industry, teams undertake exploratory analysis of socioeconomic and educational Open Data. Data analysis is combined with scientific writing, insofar that the teams present their research findings in the form of scientific manuscripts, which are then evaluated by academics and industry professionals. All aspects of the BDC, including the delivery of workshops, resources, and mentorship, will occur online and are equally accessible to all students regardless of their location or other circumstances.

The BDC engages teachers and their classrooms with Open Data analysis to strengthen their works, and apply what they learn. Science and learning are collaborative efforts, and we wish to further promote this standard.

At the end of the program, the research abstracts of all teams and the manuscripts of winning teams are published in the open access, peer-reviewed [NRC Research Press STEM Fellowship Journal](#). The top teams are then invited to defend their findings in front of a panel of experts in competing for monetary and academic prizes, at the culminating finale event.

## PROBLEM STATEMENT

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This year's National Big Data Challenge encourages high school students across the country to apply their computational thinking efforts on [UNESCO Sustainable Development Goal 4](#) (SDG 4) "Equity in Education". One may use federal, provincial, municipal, and NGO Open data to seek ideas for better education for all regardless of socioeconomic, cultural, and geographic background, or even pandemic-related hardships.

### Through this challenge, students will:

- Collect and Investigate Data on access to education, locally, globally, in-person, and online.
- Analyze the role of gender, race, geographical region, and socioeconomic conditions on learning outcomes and the delivery of education.
- Hypothesize and Formulate innovative solutions to improve equality in education.
- Present Findings in the form of a scientific report.

### Why participate?

- Develop **analytical** and **computational thinking** by using **computational techniques** in the context of current, real-world challenges in education.
- Learn **data visualization** to present student-found results from Big Data analytics.
- Engage in an **interdisciplinary**, problem space led by student-driven inquiry.
- Practice **scientific writing** and publish your ideas in the peer-reviewed [STEM Fellowship Journal](#), through the largest national scientific publishing group.
- **Network** with academics, industry professionals, and other forward-thinking students.

### Research topics can include any fields of education, such as, but not limited to:

- Family, community, and social network support in student learning and achievement. Best practices and education results in gender, race, and low income groups of students.
- The impact of the COVID-19 pandemic on lesson delivery, assessment and evaluation: personal, peer, and Big Data perspectives.
- How internet access can assist in overcoming traditional barriers to education such as availability of buildings/classrooms, teachers, learning supplies, distance to educational facilities, accommodation and provision of learning opportunities for youth with disabilities.
- The effectiveness of programs assisting economically disadvantaged youths on student achievement.
- Comparative analysis of in-person, blended, and online learning to achieve a more level footing for all students.

## PRIZES

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- **Scholarly publication** of winning project manuscripts in the peer-reviewed *STEM Fellowship Journal*, published by NRC Research Press.
- **CCUNESCO Scholarly Communication Award**  
*In memoriam of Mohammad and Zeynab Asadi-Lari*
  - 1st Prize: \$1000 + Publication
  - 2nd Prize: \$250
  - 3rd Prize: \$100
- **Kimberly Foundation Price for Transformative Ideas**  
*In memoriam of Hugh and Pat Morris*
  - 1st Prize: \$1000 + Publication
  - 2nd Prize: \$250
  - 3rd Prize: \$100
- **Let's Talk Science Analytics Talent Awards**
  - 1st Prize: \$1000 + Publication
  - 2nd Prize: \$250
  - 3rd Prize: \$100
- **RBC Arnold Chan Memorial Award for Student Innovation**
  - \$1000 + Publication
- **More to come soon!**

## SCHEDULE

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### Information Sessions:

September 21 - October 9, 2020

Q&A and sample workshops for teachers and their students about the High School Big Data Challenge. Recordings and material will be provided following the orientation session.

Students may register [HERE](#).

1. Teacher Q&A Session - **September 21, 2020 6:00pm ET**
2. Data Science Workshop for Teachers- **September 27, 2020 9:30pm ET**
3. Student Q&A Session - **October 5, 2020 6:45pm ET**
4. Data Science Workshop + Q&A for Students **October 9, 2020 6:45pm ET**

### Registration Deadline:

October 20, 2020

Form your teams of up to 4 students and register them online [HERE](#).

### Challenge Period:

October 20, 2020 - January 22, 2021

1. Crowdsource resources and investigate analytics tools (SAS, Python, Pandas, etc) choose the one you will learn and use.

- a. Workshops covering Data Science and Programming techniques will be provided to participants to help with this.
2. Attend mentor sessions and ask questions to learn more about anything within the realm of data science and its applications.
3. Work on your data set for 3 months. Work together with your team, making use of your mentors, teachers, and the provided resources to analyze your data and propose solutions.
4. Tell the story of your data discovery through a scientific report. Use [Overleaf](#) to prepare your project report, and submit it to us at [bigdata@stemfellowship.org](mailto:bigdata@stemfellowship.org).

**Project Submission Deadline:**

January 23, 2021

Submit your project report developed in [Overleaf](#) before the deadline (2:59 AM on January 23) for evaluation by a team of academics and industry experts.

**Finalist Announcement:**

February 5, 2021

The finalists (top 20 teams, 10 per region) will be announced! If selected, your team will have the opportunity to present your work at Big Data Day.

**High School Big Data Day:**

February 16, 2021

The Big Data Day will either be organized online or take place at the Toronto and Calgary/Vancouver locations.

**CONCERNS REGARDING THE CORONAVIRUS (COVID-19)**

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At STEM Fellowship, we care about the health and safety of our participants and the community at large. The Big Data Challenge will be conducted entirely remotely and online this year.

Should the COVID-19 Pandemic persist and prevent an in-person Big Data Day, we will have the Big Data Challenge finalists submit a video presentation and have judges evaluate them remotely.

Further, we will host video-conference interviews with academia and industry experts, as well as video presentations of speakers instead of the live round table and presentations at Big Data Day.

**Who to Contact with Questions**

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Anish Verma - Chief Data Officer

[anish.verma@stemfellowship.org](mailto:anish.verma@stemfellowship.org)