Data Science Impulse 2021-22

General presentation

Created to promote interdisciplinary exchanges and collaboration around data management and processing, the Data Science Competence Center (CCSD) at the University of Geneva intends to lead, each year, a collective reflection on a particular theme. In this perspective, the Scientific Computing Support (SciCoS) has joined the Data Science Impulse initiative to offer its expertise in scientific computing, to support researchers in the development of innovative methods.

For 2021-2022, the theme chosen by the Center is "Shaping a better future with Data: Data Science and Sustainable Development Goals". It aims at **exploring the many ways in which data science contribute to open up new approaches to tackle the challenges related to the achievement of the SDG's**.

In order to support this reflection, the **CCSD and the SciCoS are conjointly launching the "Data Science Impulse" grant, intended to support the development of a project led by an interdisciplinary team of UNIGE researchers, on the theme of the year.** This impulse grant, in the amount of CHF 25,000.- (of which CHF 20'000 in scientific computing support) , aims to support the maturation or consolidation of a project, with a view to its future submission to other Swiss or international research funding programs.

Who is eligible for "Data Science Impulse"?

All researchers from the University of Geneva proposing a project related to data science and to the annual theme are eligible for the "Data Science Impulse" grant. For 2021-2022, the project must be capable of developing an innovative scientific method and / or deepening and shedding light on a research question related to the Sustainable development goals. It must also be supported by an interdisciplinary team made up of UNIGE researchers from different Faculties / departments / sections.

Call opening and closing dates

The call for the "Data Science Impulse" will open on 12 October 2021. It will be closed on 15 December 2021 at midnight.

Contact

Guive Khan-Mohammad, PhD., CCSD Program Manager, guive.khan@unige.ch

Global warming, growing inequalities, destruction of ecosystems, the return of authoritarianism, the race to industrialize and urbanize...**. The contemporary challenges facing our societies are expressed, to an ever-increasing extent, on a global scale.** The development of effective initiatives to face these challenges must be thought of on the same scale.

With this in mind, in 2015, the United Nations member heads of state and government adopted the **resolution "Transforming our world: the 2030 Agenda for Sustainable Development".** This program constitutes the global reference framework for sustainable development, with the aim of eradicating extreme poverty and hunger, fighting against the degradation of the planet and promoting peace and prosperity. To do so, it sets **17 Sustainable Development Goals** (SDGs) and 169 targets to be achieved by 2030.

Integrated and indissociable, the SDGs consider social, economic and environmental dimensions in a balanced way, **thus making their achievement conditional on a detailed understanding of complex and interdependent systems. This requirement has contributed to giving the data-driven approach a central place in the elaboration of public policies in favor of sustainable development, on a global, national and regional scale.** However, such an approach requires access to quality data in each of these fields of action, but also, and above all, the ability to effectively analyze these diverse data sets (socio-economic, environmental, agricultural, energy, demographic, etc.) in a relevant manner.

In this respect, data science is a central tool that can contribute to the achievement of the SDGs: in addition to dealing with issues related to data collection, it also makes it possible, through the application of specific methods, techniques and practices, to solve complex, unstructured and data-rich problems.

In scientific research, data science is already involved in many ways in the pursuit of the SDGs, either explicitly or implicitly. Statistical and computational sciences in particular can work to develop innovative methods and tools for significant advances in the way certain complex problems are addressed. Totally or partially automated, data collection can now be done on ever larger sets, with ever more powerful tools. However, the question of data access and interoperability is at the heart of work on ontologies and standardization. What role can data science play in maintaining data sets that are useful for the pursuit of the SDGs? The generalization of digital tools also opens new perspectives in the expansion of the potential of participatory science, and of the role of citizens in the collection and description of data useful for scientific research. Downstream, the complexity of statistical models

and their cross-disciplinary use in a multitude of disciplines allows for more refined analyses. Insofar as learning algorithms are applied to relevant bodies of data, for well thought-out problems, the expression "AI for Good" is not just a slogan and can be a reality. These methods can indeed help, in some cases, to anticipate economic, political and environmental evolutions in a complex way, taking into account numerous factors - and notably human ones. The application of these techniques is not without consequences, however, as there may be a risk in trying to approach sustainable and social development issues through purely quantitative approaches and generative applications. Does the quantification of reality appear to be sufficient to grasp the challenge of the SDGs? Critical reflections on its limits, notably by the social and political sciences and the humanities, or linked to ethical and legal considerations, should help refine these analyses. The final objective, the transformation of public policies and even modes of governance, and the establishment of incentives for more sustainable individual and collective actions, probably depends on an intelligent conjunction of all approaches.

In order to support and promote these perspectives, the Competence Center in Data Science of the University of Geneva intends to articulate its reflection for the year 2021-2022 around the theme: **"Shaping a Better Future with Data: Data Science for Leveraging Sustainable Development Goals"**. This **interdisciplinary, technical and critical reflection** will focus, on the one hand, **on data and innovative methods in data science entering the study of the many fields of research covered by the SDGs** and, on the other hand, **on the legal, political, social, economic and ethical issues of the use of quantitative data in the management of global challenges**. In this context, the aim is to give increased visibility to projects already initiated by UNIGE researchers, in order to foster interdisciplinary dialogue, but also to give an impulse to the creation of new interdisciplinary projects on themes linking data science and the SDGs.

A call for participation in the UNIGE Data Science Day 2021, which will be held on 16 September 2021, and a call for projects, for an impulse fund of CHF 25,000, are launched for the UNIGE research community, all disciplines included.

Guidelines for "Data Science Impulse"

1. Grant description

Objective

The "Data Science Impulse" grant intends to offer support for scientific collaboration:

1. Proposing a project related to data science and to the annual theme likely to develop an innovative scientific method and / or to deepen and shed light on a research question linked to Sustainable development goals.
2. Formed around an interdisciplinary team, made up of UNIGE researchers from different Faculties / departments / sections.

What is offered

The project selected by the evaluation committee will receive an impulse grant of CHF 25,000.

This impulse grant is conjointly offered by the CCSD and SciCos, which respectively provide to recipients seed funding (CHF 15'000.-), in the form of real money, and in-kind supports (CHF 10'000.-), in the form of an equivalent amount of working hours. .

What is expected

The team awarded the impulse grant will be expected to:

- Actively participate in the activities of the Data Science Competence Center
- Present their primary results during the UNIGE Data Science Days (September 2022)
- Systematically mention the support of the Data Science Competence Center and the Scientific Computing Support in publications associated with the project

Duration and reports

The project supported by the "Data Science Impulse" grant must start upon receipt of funds, or by 1 April 2022 at the latest. The starting date of the project must be communicated in writing to the CCSD Program Manager. The project must be completed by 31 March 2023 at the latest. Recipients will participate in meetings every three months to keep the CCSD and SciCoS informed of the progress of the project.

2. Selection criteria

Project proposals will be assessed based on the following criteria:

1) Compliance with the objectives of the call for projects

The proposals must be structured around the following three key aspects of the 2021-22 "Data Science Impulse" call for projects:

a) The project must use an approach involving data science (as defined on the CCSD website)
b) The project must deal with Sustainable development goals (in the sense specified by the call)
c) The project must have an interdisciplinary dimension, through the collaboration of UNIGE researchers.

2) Academic and social relevance of the project

The projects will be assessed based on their academic and social relevance. They must be likely to develop a scientific method and / or to deepen and shed light on an innovative research question.

3) Skills of the applicants and feasibility of the project

Applicants (with the support of the SciCoS) must be able to carry out all the activities necessary for the successful completion of their project, whether these are of a technical, scientific or operational nature.

The proposal must be convincing in regards to its technical, human and temporal feasibility, and the expected role played by SciCoS team (application developement, operational support, etc.)

4) Medium-term project development strategies

The "Data Science Impulse" grant aims to support the early stages of development of interdisciplinary projects in data science. As such, it is crucial that applicants include obtaining this fund in a medium-term financing strategy, which can in particular be based on future submission to other Swiss or international research funding programs.

3. Selection process

Submission process

Applicants are invited to submit their project before 15 December 2021 at midnight by sending it to the following address: ccsd@unige.ch.

Proposals must be submitted using the project submission form provided on the CCSD website at the following address: https://www.unige.ch/datascience/en/research/data-science-impulse/

Assessment process

The proposals will be assessed by an evaluation committee composed of a representative of each Faculty of the University of Geneva. This committee will meet in January 2022 and its decision will be made public no later than 15 February 2022. Teams will also be informed of rejection decisions on the same date (reasons for non-selection will not be specified).

4. Grant management

Grant transfer and in-kind support

As soon as the project is selected and the Grant letter signed, the CCSD will transfer the entirety of the seed funding part of the Grant to a university account managed by the Recipients. The in-kind support part of the Grant, provided by SciCoS, will start at the same time.

Duties of the applicants

Every three months after the launch of the project, a meeting between the applicants, the CCSD and SciCoS will be organized to take stock of the scientific activities carried out. Six months after the start of the project, applicants are expected to send to the CCSD Program Manager a mid-term financial report. By the end of June 2023 at the latest, applicants are expected to submit a final activity and financial report, as well as a short report concerning the results obtained and the prospects made possible by the support of the CCSD and SciCoS. This short report will be published on the CCSD website.

Authorized expenses of the seed funding part of the Grant

The seed funding part of the "Data Science Impulse" grant (CHF 15'000.-), provided by the CCSD, cannot be used to finance conferences or seminars.

The purpose of the fund is to contribute to the consolidation of a research project, by providing concrete technical support for carrying out research activities.

In this perspective, CHF 10'000.- out of CHF 15'000 must be directly used to acquire the support of SciCoS, such as dedicated application development, high performance computing operational support, etc.

The rest (CHF 5'000.-) of the seed funding part of the "Data Science Impulse" grant can be used to collect and process data (recovery, cleaning, structuring, analysis). This includes funding for travel (if justified by data collection), purchase of hardware and software, and payment of salaries.

If any doubt arises about the proper use of the grant, applicants are required to contact the CCSD Program Manager for a discussion prior to incurring any expense.