

Education for Data Science – A Collaborative Workshop of CODATA and the Israel Academy of Sciences and Humanities

February 7-9, 2021 (tentative)

Location: Israel Academy of Sciences and Humanities

The Israel Academy of Sciences and Humanities, in collaboration with CODATA, is organizing a workshop on ***Education for Data Science***.

Data Science is imperative in the scientific world today, where large data repositories are collected in varied disciplines and are being integrated, mined and analyzed, in order to enable interdisciplinary research. It is required in the business sector, where data is the “oxygen” for business survival; and it is needed in the governmental sector in order to improve its services to citizens.

Data Science includes the methodologies and technologies involved in the analysis of data, from the staging of a problem, generation of relevant data, filtering and analyzing the data and communicating the results and the uncertainties involved, while being aware of ethical implications of the process. These methodologies have been developing in diverse areas of science and engineering for quite a few years. However, the availability of huge amounts of data (“Big Data”); the increase in computational power; the methodological progress in analysis (statistical and machine learning); and some impressive successes in image and video analysis, voice recognition, and text analysis; have forced professionals in these areas to work more closely together. These tendencies have contributed immensely to the emergence in recent years of Data Science as a discipline of its own. In turn, Data Science is an engine behind the progress in Artificial Intelligence, and the two are tightly interrelated.

Proficient researchers in Data Science, as well as professionals in the growing ecosystem of professions with titles such as Data Analyst, Data Steward or Data Technician are in high demand, and will rapidly increase in future years. There is a need to create the educational system, including the training programs that will help prepare the data professionals of the future. Therefore, the Israel Academy of Sciences and Humanities, in collaboration with CODATA, is organizing a workshop on ***Education for Data Science***.

Purpose: The purpose of the workshop is to discuss how Data Science should be taught in academic institutions and what kind of training and retraining can help support the need for new professionals in the data science ecosystem. The workshop will deal with the following levels of education:

1. Graduate programs intended for researchers and advanced (graduate) students.
2. Undergraduate programs intended to students who wish to specialize in Data Science, either for career purposes or for postgraduate studies and research.
3. Cross campus programs intended to expose all the students on campus in every discipline to Data Science, in order to train them to study, to do research, and to work in the digital world. Such programs ask: ‘what are the core data science skills that all researchers and university qualified individuals need?’
4. Training Programs that will help to educate researchers and faculty members within academia and research institutions who are in need of the required new skills to operate in the ‘Big Data’/Data Science ecosystem.

Participants: about 15 experts from all over the world nominated by CODATA and about 10 to 15 Israeli academic scholars selected by the Academy. The participants should belong to a wide variety of academic disciplines – either to the developing and research side of Data Science, to new programs that develop the discipline of Data Science, or to the application and user side (e.g., Physical Sciences, Digital Humanities, Law, Social and Human Sciences, Life Science, Medicine).

Products: Summary and conclusion documents with recommendations related to best practices or approaches that address the aforementioned levels. This output will result in a collection of journal articles and/or a report/white paper to the academic and professional communities as well as input to the Israeli academic community.

Timeframe: The workshop will last two days. After an introductory session and keynote, the workshop will consist of seven sessions of 1.5 hours each: four sessions on the first day; three sessions on the second day. On the first day, each session will include:

- 25x2 (total 50 minutes) of a lecture assigned in advance to two of the participants, one from Israel, one from the global CODATA community;
- 10 minutes of response by another participant designated in advance;
- 30 minutes of discussion led by the session moderator.

The sessions on the second day will follow a slightly different format and will include a presentation and discussion of the Israel Academy Report on Education for Data Science. The workshop will close with a cross-cutting discussion to consider the themes that have emerged and to identify recommendations.

Agenda

Day 1.

1. Introductory Keynote

09:00–09:45: An opening session with greetings and an introductory talk on the changing role and impact of Data Science.

2. Academic programs. Two speakers on a predetermined topic, followed by a respondent and then Q&A and an open discussion.

09:45–11:15: Session 1. Bachelor level programs in Data Science. *Review and discussion of undergraduate Data Science programs.*

11:15–11:45: Coffee break

11:45–13:15: Session 2. Masters level programs in Data Science. *Review and discussion of graduate Data Science programs.*

13:15–14:15: Lunch

14:15–15:45: Session 3. PhD Programs in Data Science. *Review and discussion of potential research areas and topics for doctoral studies in Data Science.*

15:45–16:15: Coffee break

3. Non Academic Programs and Workshop Summary

16:15–17:45: Session 4. Training Programs in Data Science: How to educate researchers and faculty members within the academia and research institutions to operate in the big data/data science ecosystem. *Speakers will cover initiatives such as the CODATA-RDA Schools, the Carpentries and other CPD or skills programs.*

18:15: Dinner

Day 2.

4. The Israeli Academy Committee Report and Responses: data science for all domains on campus

09:00–10:30: Session 5. Basic skills in data science required for students in every discipline on campus. *Members of the Israeli Academy Committee will present its recommendations for a cross campus DS introductory course (covering various research domains, including social sciences, humanities, law, management and arts; life sciences and medicine; physical sciences and engineering; libraries, Open Data and scholarly communications).*

10:30–11:00: Coffee break

11:00–12:30: Session 5b. Basic skills in data science required for students in every discipline on campus. International Community will present examples of data science education for domains.

12:30–13:30: – lunch

13:30–15:00 – Session 6. Closing cross-cutting discussion of all sessions and recommendations of good ideas and good practices.

15:00–17:00: Concluding meeting of the organizers (from CODATA and the Academy) to decide about the publication process and outlet(s) of the workshop discussions.

18:30: Dinner (for those participants who can stay).

Day 3.

09:00–12:30

(Optional) A guided tour of Jerusalem for the international participants.