Final Report on the 2025 V4SDB Student Winter School

28.01.2025 – 31.01.2025

ELTE Eötvös Loránd University

Budapest, Hungary

2025

1.   Introduction

The 2025 Student Winter School, organized by V4SDB Vice-President, Dr. Máté Varga at ELTE Eötvös Loránd University in Budapest, between 28-31 January, provided further opportunity for our Society to pursue the tradition begun in 2022 and continue with its series of **regionally significant, student-targeted, practical "schools"** that ensure talent development in the region within the fields of developmental and stem cell biology. While the previous Student Summer Schools provided general practical knowledge and focused primarily on the early stages of embryonic development in terms of content, this latest event **made the processing of large datasets generated through the use of the most modern imaging procedures its central theme**.

Volumetric electron microscopy, procedures that monitor neuronal activity through calcium release measurements, or next-generation light microscopy methods (e.g., light-sheet microscopy) generate enormous amounts of data, which can only be analyzed using specialized software procedures. **These next-generation image analysis programs are often based on machine learning**, which greatly assists in processing datasets, while making it even more important that users have appropriate knowledge about their operation.

To provide the most up-to-date information for our participants, we invited foreign experts who are recognized specialists in the mentioned fields as Winter School speakers:

- Gáspár Jékely (Centre for Organismal Biology, Heidelberg, Germany),
- Joanna Pylvänäinen (Åbo Akademi University, Turku, Finland),
- Isaac Bianco (University College London, London, United Kingdom),
- Kenzo Ivanovitch (University College London, London, United Kingdom),
- Adriana Nagy-Dăbâcan (Transylvanian Institute of Neuroscience, Cluj, Romania).

(*Note: one additional speaker, Giulia Bertolin, unfortunately had to cancel her participation at the last moment due to family reasons*).

2.   Implementation of the Student Winter School

We advertised the Student Winter School on various online platforms (V4SDB website, and on the Society's Facebook, Bluesky and Mastodon social media accounts) and mailing lists (V4SDB). Ultimately, we welcomed in person **a total of 58 participants from 15 countries and 16 institutes** (*Note: Initially we received 70+ registrations, but, unfortunately, due to an influenza epidemic ongoing at the time of the event, we got nearly half a dozen cancellations at the last minute*).

Since the level of the planned practical lectures greatly depended on the participants' existing bioinformatics knowledge, applicants had to complete a survey during registration. The results of this survey (Figure 1) revealed that ***most participants only had basic knowledge of commonly used bioinformatics platforms***, which required corresponding planning from both the speakers and organizers.
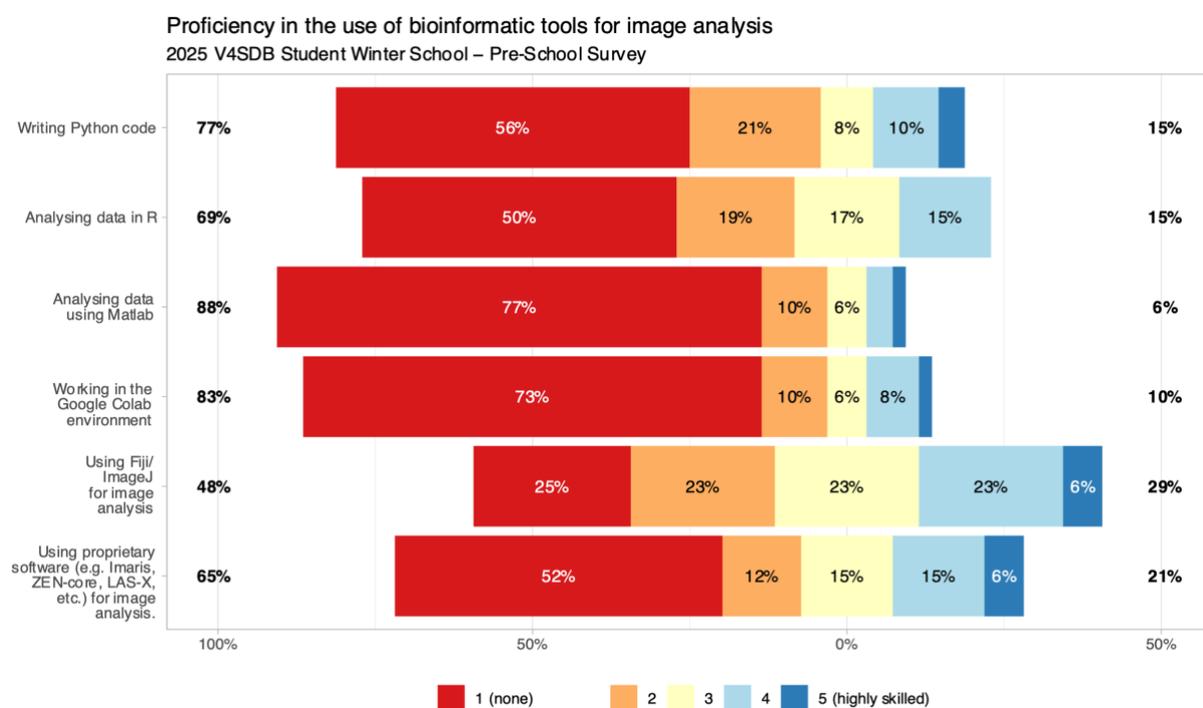

Figure 1: Prior bioinformatics knowledge of participants in the 2025 V4SDB Winter School.

Part of this preparation phase was, for example, **creating an online platform** from which students could download the datasets used, and where they could already become familiar with the tasks in detail before the practical sessions:

https://danio-elte.github.io/2025V4SDBStudentWinterSchoolMaterials/

To ensure the fewest possible interruptions during practical lectures and to expediate assistance to participants who required it, we also ensured the participation of student assistants already proficient in bioinformatics. These assistants helped participants with installing the appropriate software and could also provide answers to any coding questions that arose.

Our speakers held **four four-hour sessions and one one-and-a-half-hour practical** during the workshop, see detailed program at: https://danio-elte.github.io/2025V4SDBStudentWinterSchoolMaterials/programme.html.

As part of the programme, **Prof. Gáspár Jékely also gave a separate lecture on Open Science principles**, demonstrating how it is possible to properly store/publish large image/imaging datasets and the algorithms that process them in open-access (OA) data repositories and platforms. The slides and a recorded version of this lecture are stored, and freely avaialable, on the Winter School's webpage:

https://danio-elte.github.io/2025V4SDBStudentWinterSchoolMaterials/open_science.html.

3. Satisfaction Survey

As with previous V4SDB Summer Schools, after the event we asked participants to complete an anonymous questionnaire; an important reference point for organizing similar future events. This indicated the types of activities we should prioritise and what changes we need to implement during program organization in the future. **The questionnaire was completed by 27 people, nearly half of the participants**, which allows us to consider this a significant sample.
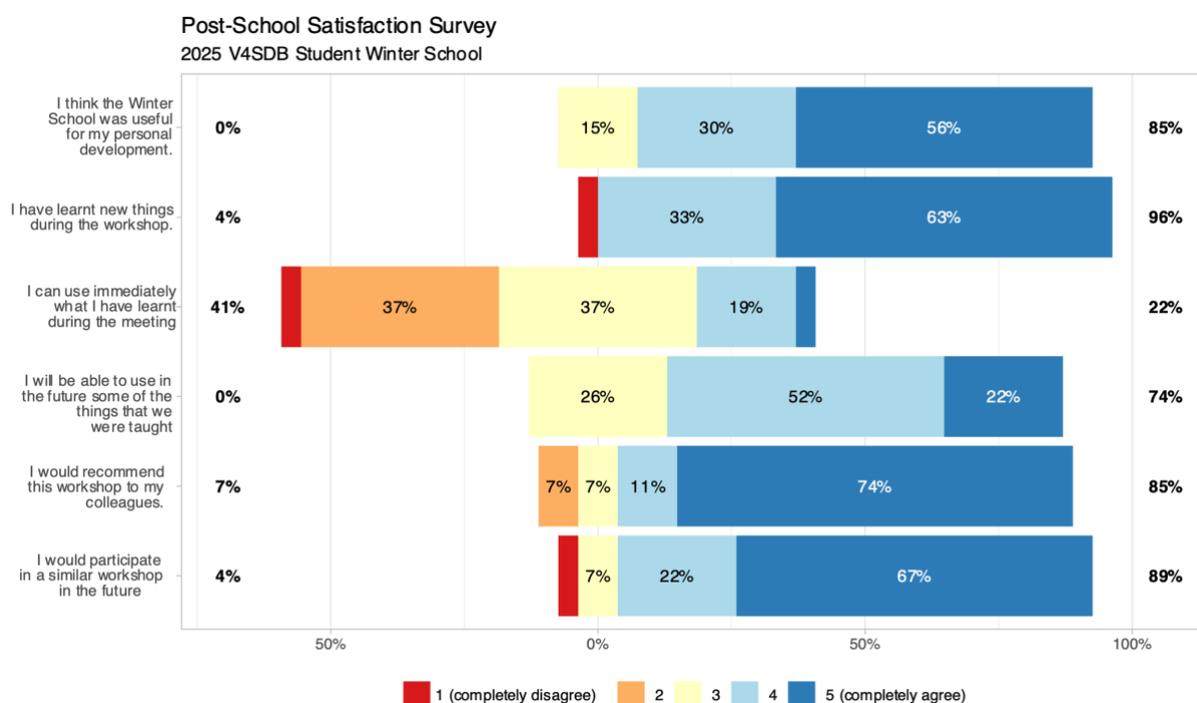

Figure 2: Results of the satisfaction questionnaire completed by V4SDB participants.

As clearly evident from our survey results (Figure 2), participants evaluated the event very positively: more than 95% indicated they learned new things, nearly 90% would participate in similar workshops, and 85% would recommend this workshop to their colleagues. The only disadvantage (if it can be called that) is that participants cannot immediately utilise all newly acquired knowledge in their work.

Therefore, overall, through the combined use of NKFIH (MEC_SZ_24) and ELTE (KON_24) support, we successfully conducted a very high-quality and successful Winter School, where more than fifty participants could become familiar with the analysis of the most modern imaging procedures. School materials will continue to be available on the dedicated webpage for all interested to master these data analysis skills.

Due to the aforementioned funding sources the Winter School did not use any V4SDB funds.