



D8.2 Report on newly developed courses organized by EU-OS-DRIVE

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1 Introduction

EU-OPENSREEN (EU-OS) is the European Research Infrastructure for Chemical Biology, which was established as a European Research Infrastructure Consortium (ERIC) by seven countries (the Czech Republic, Finland, Germany, Latvia, Norway, Poland, Spain) in April 2018. In 2019, Denmark joined as the 8th ERIC member.

The aim of EU-OPENSREEN is to develop novel chemical compounds that exhibit specific biological responses on organisms, cells or cellular components in a defined, well-understood and specific manner, in collaboration with external researchers. These compounds can be used by researchers as research tools (or 'probes') to study fundamental cellular processes, such as signalling or metabolic pathways in immune responses, tissue repair etc. EU-OPENSREEN develops these probes by screening collections of over 100,000 compounds using robotics-based high-throughput screening (HTS) platforms in an automated process, followed by a hit-to-probe optimisation.

The three main user communities of EU-OPENSREEN are:

- Biologists, who wish to develop suitable assays that are amenable to screening and that are interested in developing 'tool' compounds for their research of interest.
- Organic chemists, who seek to make their compounds readily available through EU-OPENSREEN and thereby to expose them to a wide range of different biological targets in order to uncover potential biological activities of their compounds.
- Users of the EU-OPENSREEN database, who access the screening datasets, which EU-OPENSREEN makes publicly available without restrictions on use.

The EU-OPENSREEN-DRIVE (DRIVE) project unites 34 partners from 16 different European member or associated states aiming at accelerating the implementation of EU-OPENSREEN services, and extending its capacities and competences in the fields of chemoproteomics and fragment-based screening. These aims are categorised into ten work-packages (WPs) in order to facilitate the delivery of the project.

A prerequisite for the successful operation of the EU-OPENSREEN ERIC is expert staff including scientists, engineers and technicians trained in the state-of-the-art technologies needed to deliver screening and medicinal chemistry services to users. The dedicated training WP has the following main objectives:

- to identify training gaps, and to develop a **suitable training program for external users** to reduce the barrier to enter projects and increase readiness and quality of incoming projects.
- to promote and integrate **service-oriented** operations
- to use **modern training tools** as part of training delivery (eLearning etc.)
- to improve **integration into existing European training programs**.

Intended to benefit users, researchers, and industrial representatives, the proposed EU-OPENSREEN-DRIVE training program will *i)* bring together specialised partner sites and their expert knowledge, and *ii)* build up an educational platform to create new training opportunities for users and potential users. By linking different expertise from different partner sites, the proposed program will overcome educational gaps at single sites. The more experienced users will gain better awareness of chemical biology, infrastructure services, and their future requests and applications for infrastructure services will be more appropriately formulated.



Researchers from future partners of ERIC non-member/observer countries will gain valuable knowledge by participating in webinars and on-site courses during their stays in the highly equipped and experienced partner sites in ERIC member countries.

The overall EU-OPENSSCREEN-DRIVE training program for users and EU-OPENSSCREEN staff will include:

- **Web-based activities** such as live web-based video courses (webinars) or web-based theory courses. EU-OPENSSCREEN intends to develop and offer web-based platforms for training and education, which will allow maximum flexibility for communities to be trained (by matching the individual schedules of trainees), and will be less prone to capacity limitations. Very importantly, students, teachers and researchers taking care of small children can easily complete such courses. In fact, this will allow to prioritise the gender balance during the design and resourcing of courses.
- **On-site practical courses:** the theoretical web-based courses will be complemented by on-site practical courses at one or more EU-OPENSSCREEN partner sites. Typically, practical courses will be condensed into 2-3 days, to allow students and researchers with limited time capacities to attend the courses.
- **Staff exchanges** for scientists coming from prospective partner sites in member and non-member countries.
- **Links to international training networks, graduate programs, summer schools** with the aim to coordinate the training activities with other ESFRIs e.g. ELIXIR, which organises bioinformatics and data science-related workshops and courses *etc* and other national and international training initiatives. This aspect will be described in detail in a separate deliverable (D8.3) entitled “Report on co-ordination of joined training with other BMS ESFRI projects and establishing new collaborative links”.

This deliverable, D8.2, “Report on newly developed courses organized by EU-OS-DRIVE” relates to task 8.1 “Organise and implement courses on training of users and potential users” and tackles the first two objectives described above. This is an ongoing task throughout the EU-OPENSSCREEN-DRIVE project and will end in month 48. As such, this report summarizes the result of the work from the first 18 months of the EU-OPENSSCREEN-DRIVE project, while discussions on future training activities will continue.

In the following sections, we report on the EU-OPENSSCREEN-DRIVE training program describing in detail the different offers (e.g. webinars, on-site courses, etc) and giving an overview of the hosting partners, while other training activities linked to international and national networks and other Life Science Research Infrastructures (LS RIs) (previously named Biological and Medical Science (BMS) RIs) will be discussed in detail in deliverable 8.3 due in month 18.



2 Discussion

2.1 EU-OPENSREEN-DRIVE training program

The results obtained from the surveys and the web-mining reported in [deliverable 8.1](#) indicated that a number of courses and training programs in chemical biology and drug discovery are already offered by both DRIVE institutions and organisations outside of the DRIVE community. The training opportunities offered by DRIVE institutions range from regular courses, which are imparted in master and doctoral universities' programs and repeated annually, to one-off workshops. The annually organised courses are rather on-site courses and the existence of theoretical web-based courses is missing. In order to fill this gap, the DRIVE project will bring together our specialised partner sites to create and prepare a web-based educational platform with the following **webinars**:

- *Introduction to High Throughput Screening*: an online course for academic and industrial researchers considering HTS as part of their research aimed at users and prospective users
- *Tool compound and probe evaluation and selection*: an online course on how to use these powerful tools for the exploration of the bioactive compound space, selection of appropriate tool compounds and controls for HTS experimental design aimed at users and prospective users
- *Introduction to chemo-sensitive profiling*: an online course on principles of basic bioprofiling assays and how to annotate newly synthesized chemical compounds aimed at chemists
- *Open access principles*: an online course on open access principles and informing external users of the access policies of EU-OPENSREEN aimed at users and prospective users.

The online webinars are recorded and placed on the [DRIVE](#) and [EU-OPENSREEN webpages](#) for future viewing. Our library of webinar recordings is free and accessible to everybody.

As reported in deliverable 8.1, **on-site practical courses** and hands-on training offered by the chemical biological community are in far greater abundance. The DRIVE institutions organise practical courses on a regular basis and in many cases in collaboration with local institutions. The expertise of DRIVE institutions' researchers together with their excellent laboratory equipment guarantees the high quality of on-site courses, which will be offered during the DRIVE project lifetime. The courses will be held in English and open to anybody from the chemical biology community and beyond. The courses will be offered free of charge and attendees will only have to pay for their travel costs. The DRIVE courses will cover the following topics:

- *Compound logistics*: a course on the use of sophisticated robotics systems to manage small molecule screening compound collections. This course is intended mainly for staff from prospective partner sites involved in compound collection management.
- *Assay development*: a course on the practical basis of assay development in HTS aimed at users and perspective users
- *Data mining*: a course for data storage and analysis in high-throughput screening
- *Hands-on training and workshops for practical and legal aspects*: a course related to compound acquisition procedures aimed at users, perspective users and partner sites staff. It will be also organized as online workshop.

Short-term staff exchanges will be organised with the aim to train screening centre and medicinal chemistry research group staff members on new techniques. The start of the staff exchanges was foreseen for month 12 (M12) and has recently been postponed due to the [coronavirus pandemic](#).



One summer school on chemical biology and drug discovery will be organized in 2021/2022. Detailed information about the summer school are reported in deliverable 8.3.

The EU-OPENSSCREEN-DRIVE training program scheduled for years 2020 and 2021 is summarised in Table 1. This training program will be an integral part of the EU-OPENSSCREEN ERIC training activities, which are available at the following link: <https://www.eu-openscreen.eu/services/training.html>.

Table 1. EU-OPENSSCREEN-DRIVE training program for 2020-2021. The performed training activities are highlighted in green

Presenters (DRIVE partner)	Title of the training activity	Date	Type	Access	Targeted audience
Sarka Simova (IMG); Francisca Vicente (MEDINA); Jose Manuel Brea (USC); Sheraz Gul (IME)	<i>Introduction to High Throughput Screening</i>	April 2, 2020	Webinar (WebEx)	Online, free-of-charge	Researchers and students
Ctibor Skuta (IMG)	<i>Tool compound/probe evaluation and selection</i>	September 2020	Webinar	Online, free-of-charge	Researchers and students
IME	<i>Introduction to chemosensitive profiling course</i>	October 2020	Webinar	Online, free-of-charge	Prospective compound providers
IMG	<i>Open access principles</i>	March 2021	Webinar	Online, free-of-charge	Users and prospective users
IMG	<i>Compound logistics*</i>	November 2019, 2020, [#] 2021, 2022	On-site course	On-site	Staff from partner sites and prospective partner sites
IME, UH, USC	<i>Assay development</i>	4 times during the project	On-site course	On-site	Users, prospective users and prospective partner sites staff
IMG (ECBD host) [§]	<i>Data mining</i>	September 2021	On-site course	On-site	Users, prospective users and prospective partner site staff
Partner sites	<i>Short-term staff exchanges</i>	N/ A (8 staff exchanges during the project) [#]	On-site staff exchanges	On-site	Staff from partner sites and prospective partner sites
Consortium members and external speakers	<i>Chemical biology and drug discovery summer school</i>	Summer 2021 or 2022	Summer school	On-site	Researchers and students

* The compound logistics course is organised once per year. The first course was carried out in November 2019 as a 2-day course.

[#] Date could be postponed or it is not known due to the current coronavirus pandemic.

Webinars and onsite course descriptions are provided in sections 2.1.1 and 2.2.1, respectively.

2.1.1 EU-OPENSREEN-DRIVE Webinars

2.1.1.1 Introduction to High-Throughput Screening

The first web-based theoretical course “*Introduction to High Throughput Screening*” for researchers and students considering HTS as part of their research took place on April 2nd 2020. The webinar was hosted by experts from several EU-OPENSREEN screening partner sites: Dr. Francisca Vicente from FUNDACION MEDINA (MEDINA) in Granada, Spain, Dr. Jose Manuel Brea from the University of Santiago de Compostela (USC, Spain) and Dr. Sheraz Gul from the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME) in Hamburg (Germany).

The webinar program included:

- Target identification and definition (hit, lead, drug target), assay development
- Compound collection (desired properties, compound libraries)
- Assay optimisation, pilot screen and primary screen
- Hit selection and confirmation
- Data analysis (detection technologies and data normalization)

This webinar was widely advertised through the DRIVE and EU-OPENSREEN webpages, on the EU-OPENSREEN ERIC social media accounts (twitter and LinkedIn), through the EU-OPENSREEN network and other external initiatives and newsletters. It was hosted on CISCO Webex and was free-of-charge. Approximately 150 registrations were received, of which 45 were accepted for attending the live broadcast of the seminar. The attendees were invited to submit questions during the seminar for the end of the event. The webinar was recorded and it is available on the [DRIVE](#) and [EU-OPENSREEN](#) webpages.

2.1.1.2 Tool compound/probe evaluation and selection

The web-based theoretical course “*Tool compound/probe evaluation and selection*” for researchers and students was initially planned for June 2020. Unfortunately, due to the coronavirus outbreak and the involvement of IMG in the testing of coronavirus samples, the webinar has been postponed until September 2020. It will be held by Dr. Ctibor Skuta from the Institute of Molecular Genetics (IMG) in Prague, Czech Republic. The webinar will be hosted on an online teleconference platform and recorded for future viewings. The recorded version will be available on the DRIVE and EU-OPENSREEN webpages.

This webinar focuses on the exploration of the bioactive compound space, selection of the right set of tool compounds and controls for the HTS experimental design. The Portal Probes & drugs portal (<https://www.probes-drugs.org/home/>) will be used for the webinar as an example of tool for compound/probe evaluation and selection.

2.1.1.3 Introduction to chemo-sensitive profiling

The web-based theoretical course “*Introduction to chemo-sensitive profiling*” for prospective compound providers is planned for October 2020. The webinar will be held by Dr. Sheraz Gul from the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME) in Hamburg, Germany. The webinar will be hosted on an online teleconference platform and recorded. The recorded version will be available on the DRIVE and EU-OPENSREEN webpages.

The webinar will describe the principles of basic bioprofiling assays, how to annotate newly synthesized chemical compounds and properties of hit, probe, lead and candidate compounds. It is intended to complement and provide more details on topics discussed in the “*Introduction to High Throughput Screening*”-webinar.



2.1.1.4 *Open access principles*

The web-based theoretical course “*Open access principles*” for staff from partner sites, prospective partner sites and for external users is planned for March 2021. The webinar will be organized by the Institute of Molecular Genetics (IMG) in Prague, Czech Republic, with the cooperation of the EU-OPENSSCREEN ERIC office. The webinar will be hosted on an online teleconference platform and recorded. The recorded version will be available on EU-OPENSSCREEN webpage.

This webinar will focus on the principles of open access publication of experimental data. It should explain different modes of access for the three major user groups such as assay providing users, compound providing users and the European Chemical Biology Database (ECBD) users. The access policies in the context of EU-OPENSSCREEN together with examples from particular partner sites will be presented.

2.1.2 EU-OPENSSCREEN-DRIVE on-site courses

2.1.2.1 *Compound logistics*

The on-site “*Compound logistics course*” is intended mainly for staff in charge of compound collection management and for staff from EU-OS and prospective partner sites.

The course guides the attendees through the compound workflow from compounds arrival to their usage in a screen. The use of sophisticated robotics systems to manage small molecule screening compound collections and the laboratory information management system (LIMS) database developed in-house is demonstrated. This course is planned to be organised four times as a 2-day course during the project duration at the Institute of Molecular Genetics (IMG).

The first course took place at IMG on 28th and 29th November, 2020, was led by Martin Popr and Ctibor Škuta from the CZ-OPENSSCREEN and it is planned every year in November.

In 2020, the course started with a lab tour in the CZ-OPENSSCREEN laboratories with a special focus on the compound management facility on the first day. It continued with an introduction of ScreenX DB, the web-based LIMS database developed in-house and an explanation of theoretical aspects of compound management workflows. The second course day was dedicated to practical points of compound logistics with hands-on training on an automated liquid handling workstation, sample preparation, quality control (QC), automated result validation and other know-how and skills.



A detailed program of this course is presented in the official poster as shown in Figure 1.

Compound logistics course

Date: November 28 -29, 2019
Location: Institute of Molecular Genetics of the ASCR, v. v. i. Prague, Czech Republic

Day 1 (Thursday, November 28th, 2019)	
Time	Topic
11:00	Lab tour over CZ-OPENSREEN (National infrastructure for chemical biology) laboratories, introduction of the High-Throughput-Screening (HTS) laboratory automation, description of the typical HTS Project stages from assay development to hit validation
12:00	Lab tour over CZ-OPENSREEN Compound Management facility, introduction of the standalone instruments and tools, introduction of the Automated storage system (Hamilton ASM) and Automated Liquid handling workstation (Hamilton Vantage), introduction of the Quality Control (QC) instrumentation (Waters I-Class UPLC-MS)
13:00	Lunch
14:00	Introduction of ScreenX DB (web-based in-house developed LIMS database) and functionalities essential for CM, Introduction of PROBES and DRUGS portal – a tool for high quality chemical probes and approved drugs selection
16:00	Compound Management workflow (theory vs. our approach) <ul style="list-style-type: none"> o Types of compound libraries (diversity, bioactive, academic, focused libraries, sub-libraries, fragment, etc) a their specifics o Compound acquiring (purchase x donation), approved commercial vendors, electronic data needed for effective compound registration o Compound registration/dissolving, preparing of Mother plates, Storage tube options, barcoding o Sample storage, storing dry samples x DMSO solutions, optimal storage conditions, environment control, sensitive samples with special storage needs o Library reformatting, preparing of Daughter plates (assay-ready plates), Z-reformat, types of suitable labware o Cherrypicking, hit selection, preparing dilution series for dose response experiments
19:30	Dinner
Day 2 (Friday, November 29th, 2019)	
Time	Topic
9:30	Hands-on training - Automated storage system (Hamilton ASM), setting up processes to introduce and retrieve samples, sample list formats, Cherrypicking, etc.
11:00	Hands-on training - Automated Liquid handling workstation (Hamilton Vantage), system structure, 3rd party devices, programming new assay, pipetting tools and parameters, troubleshooting and error recovery
13:00	Lunch
14:00	Hands-on training – QC by UPLC-MS, sample list creation from ScreenX, sample preparation for LC-MS, LC parameters optimization, automated result validation and reporting, single sample reporting, upload to the DB, the difficulties related to the LC-MS of large screening libraries
16:00	End of the course

Final program can be customized depending on the specific interests of the individual attendees, covering and discussing the suggested topics more in depth
 For our instrumental equipment please refer to: <https://openscreen.cz/en/node/181>
 Information on our compound collection: <https://openscreen.cz/en/compound-collection>

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Figure 1 Program of the compound logistics course organised by IMG and EU-OPENSREEN-DRIVE in Prague on November 28-29th, 2019.

The course hosted eight attendees from EU-OPENSREEN ERIC partner sites in Germany, Poland, Spain and Norway and one participant from Hungary, which is a prospective EU-OS country and DRIVE partner (Figure 2).



Figure 2 Attendees of the first compound logistic course in Prague (in 2019).

The next compound logistics course will be organized in November 2020, if possible due to the coronavirus pandemic.

2.1.2.2 Assay development

The on-site “Assay development course” is intended mainly for users, prospective users and prospective partner sites staff. The course gives a practical basis for assay development in HTS. It is planned to be organised four times during the project over the course of 3 to 4 days at the Fraunhofer Institute for Molecular Biology and Applied Ecology (IME Hamburg), the University of Helsinki (UH) and the University of Santiago de Compostela (USC).

This on-site course will cover a broad range of critical concepts underlying assay development for HTS. It is intended to be the advanced training of the theoretical web-based course “Introduction to HTS”, during which attendees got the theoretical background on assay development and related topics before embarking on the practical part of the course. Although each of the courses will be held in a different partner site, the program and the concept will be kept the same. The attendees will have the opportunity to work for a couple of days in some of the best equipped chemical biological laboratories. The capacity of the course will range from 10 to 20 attendees, depending on the partner site.

The first implementation of this course was planned for spring/autumn 2020, but due to the coronavirus pandemic and related travel restrictions the course was postponed for the end of 2020/ beginning of 2021.

2.1.2.3 Data mining

The on-site “Data mining course” is intended for users, prospective users and prospective partner site staff. The course will be organised in cooperation with the EU-OPENSREEN-DRIVE database work package (WP6) and will be dedicated to data storage and analysis in HTS. It will be organised as a 2-day course at the Institute of Molecular Genetics (IMG) in Prague, Czech Republic, once during the project duration.



The course will provide the practical basis for beginners and help to develop further knowledge in data mining. IMG will be the main organiser of this course. IMG, as [the ECBD](#) host, will demonstrate all capabilities of the ECBD and share best practices in the community.

2.1.3 Short term staff exchanges

Part of the DRIVE training program is devoted to staff exchanges. This is in line with the effort to extend the ERIC membership (task carried out in WP1 on Excellence in ERIC operations and management); in fact, EU-OPENSREEN-DRIVE also supports staff exchange from future partner sites in non-ERIC-member/observer countries to ERIC partner sites. Those exchanges relate to task 8.2, which aims at training screening centres and medicinal chemistry research group staff on new techniques, which are part of novel EU-OPENSREEN services related to chemoproteomics, fragment-based drug design (FBDD), target identification etc. Visiting trainees will be coming from partner institutions in ERIC member and non-member countries. The short-term staff exchanges (of up to two weeks each) will be beneficial, especially for sites in new/future ERIC member countries, which might not yet be as technically advanced as the founding partner sites. The start of this training activity was foreseen for February 2020 and it has currently been postponed due to the coronavirus pandemic.

2.1.3.1 Staff exchanges: hosting partners

In the DRIVE project, the following partners allocated funds to host trainees:

- **MEDI** – Fundación MEDINA, Granada, Spain
- **UiO** – University of Oslo, Oslo, Norway
- **USC** – University of Santiago de Compostela, Santiago de Compostela, Spain
- **UH** – University of Helsinki, Helsinki, Finland
- **IBCH PAS** - Polish Academy of Sciences, Institute of Bioorganic Chemistry, Poznań, Poland
- **IMG** - Institute of Molecular Genetics, Prague, Czech Republic
- **UiT** – Arctic university of Norway, Tromsø, Norway
- **CSIC** – Spanish National Research Council, Madrid, Spain

To verify the interest in hosting trainings in this context, a staff exchange hosting open call was opened internally in January 2020. This internal check enabled the possibility for other DRIVE partners to host trainees, in case an initial staff exchange program partner (as outlined in the DRIVE proposal) would not have been interested in providing staff exchange hosting anymore. The interested partners applied by filling the following training plan proposal (see 4 Annex 1: Training Plan Form).

After the closure of the call the following 10 institutions have expressed their interest to host a trainee (underlined institutions were not included in the original plan, but have shown their interest in being involved in the staff exchange activities):

1. **MEDI** - Fundación MEDINA, Granada, Spain
2. **UiO** – University of Oslo, Oslo, Norway
3. **USC** – Univeristy of Santiago de Compostela, Santiago de Compostela, Spain
4. **UH** – University of Helsinki, Helsinki, Finland
5. **IBCH PAS** - Polish Academy of Sciences, Institute of Bioorganic Chemistry, Poznań, Poland
6. **IMG** - Institute of Molecular Genetics, Prague, Czech Republic (optional)
7. **IME** – Fraunhofer IME ScreeningPort, Hamburg, Germany
8. **IMTM**, Palacky University, Olomouc, Czech Republic



9. **TUM** - Technical University of Munich, Munich, Germany
10. **G-INCPM (Weizmann)** - Weizmann Institute, Rehovot, Israel

The results from the proposed staff exchange training plans are gathered in Table 2 Training plan results.

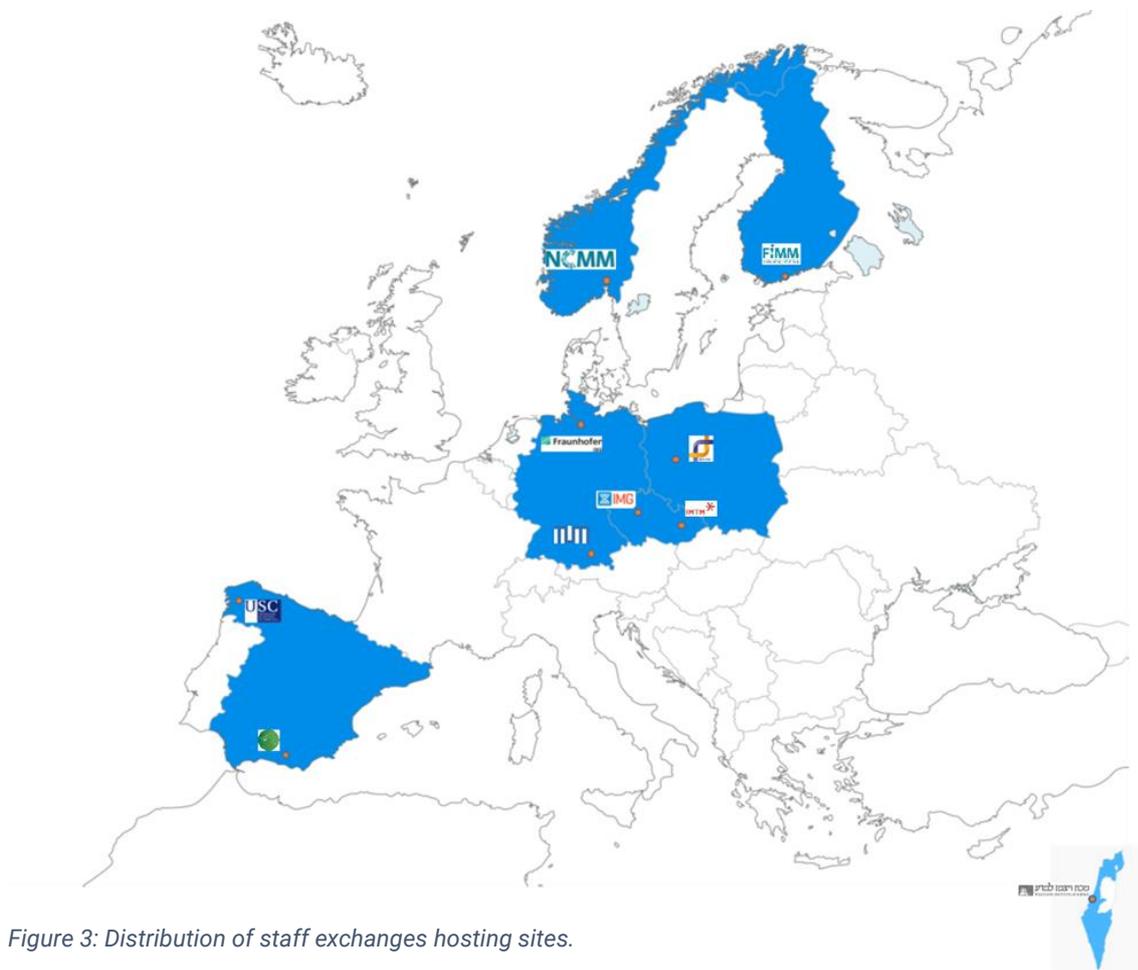


Figure 3: Distribution of staff exchanges hosting sites.

UiT and **CSIC** present in the original list, did not apply for hosting trainees. **IMG** serves as an optional partner in the reserve list, while **IME**, **IMTM**, **TUM** and Weizmann. will supplement the original list of partners resulting in an overall distribution of hosting sites in six EU-OPENSREEN member countries and 1 prospective partner in a European associated state (**Error! Reference source not found.**).

Table 2 Training plan results

Training site	Expertise	When	Detailed training plan
MEDI	High throughput screening; screening data analysis and data transfer	Q4 2020	The trainee will be introduced to experimental design, image acquisition, image and data analysis for high throughput (HT) experiments. Specifically, the trainee will learn how to use state of the art technology for HT experimentation and open-source software for image and data analysis using high content (HC) imagers such as Operetta CLS High-Content Analysis System and BD Pathway 855 High Content Bioimager. Regular weekly meetings with mentor and supervisor will be organized to follow-up training progress, in addition to the regular follow-up of activities in each of the experiments.

UiO	High throughput screening; screening data analysis and data transfer	No time preferences. Optimally during a flow cytometry-based screening project	<p>The aim of the visit will be to get insight into the use of HT flow cytometry as a readout for HTS. The trainee will receive basic training from a dedicated staff member and then follow the everyday tasks during a screening project. Optimally, the visit will take place during a period when the site is performing a flow cytometry-based screen.</p> <ul style="list-style-type: none"> -Basic training: Theoretical and hands-on training including principles of flow cytometry, sample preparation, multicolour panels, compensation, data analysis strategies. Depending on the expertise of the visiting trainee, different topics can be covered. (1-2 days) - Automated sample preparation using robotics. (1-2 days) - Participation in a screening campaign (1-2 days) - Batch analysis of screening data (1 day) <p>Alternatively, UiO could accept a trainee coming with an own small project, e.g. a pilot screen or a proof of principle experiment. However, depending on the type of project and the complexity of the assay, timelines for the visit may vary.</p>
USC	Assay development; screening data analysis and data transfer	September 2020	<p>We propose the trainee to join everyday tasks at our site with a permanent supervision from our side. Therefore, the trainee can learn about the general workflows, assay development and data analysis for the current projects. Regarding the specific tasks related to chemical proteomics, the trainee can learn about sample preparation, qualitative and quantitative proteomics as well as data processing.</p>
UH	Compound management and use of EU-OPENSREEN library; process automation; high throughput screening; screening data analysis and data transfer; other (i) Drug Sensitive and Resistance Testing (DSRT) workflow <i>in ex vivo</i> testing of patient cells, ii) flow cytometry-based DSRT	February-May or September - November, any year during the project	<p>Since UH can offer various training topics, the training plan will be tailored according to the trainee's wishes and needs. Dedicated persons from the unit will be assigned for the trainee once the training topic(s) have been decided. More information about our instrumentation and expertise areas is available at the UH-FIMM website. Examples of our UH-FIMM expertise in the topics:i) Compound management workflows at FIMM: Complex layouts with acoustic dispensing (Labcyte Access workstation); ii) Process automation and HTS: liquid handling/dispensing, workflows, planning; iii) Screening data analysis and data transfer: in-house created bioinformatics pipelines (https://www.fimm.fi/en/software-tools); Drug Sensitivity and Resistance Testing (DSRT): established clinical translation workflow for personalized cancer medicine, incl. flow cytometry-based readouts.</p>
IBCH - PAS	Assay development; medicinal chemistry strategies, other	Starting from April 2021	Participation in everyday lab activities with supervision from dedicated staff.
IME	Compound management and use of EU-OPENSREEN library; process automation; assay development; high throughput screening;	For 2 weeks between June, 2020 and November, 2020.	<p>IME preference is to host a trainee for their own proof-of-concept project. IME expects the trainee to have developed a screening-compatible assay and a suitable secondary assay that are validated and ready for automation and screening. Activities include: Week 1: Set-up of assay and demonstration of reproducibility of assay parameters (e.g. signal window/stability, absence of plate-effects,</p>

	screening data analysis and data transfer; database usage and linked IT processes		pharmacology of reference compounds and Z'). Miniaturization of the assay to a 384 well plate microtiter format/<50µl assay volume. Week 2: Proof-of-concept screen against a known-drug compound library and associated data analysis. Confirmation and dose-response studies in screening and secondary assay. The expected output are confirmed hits.
IMTM	Compound management and use of EU-OPENSREEN library, process automation assay development high throughput screening	September – November 2020, February – May 2021, September – November 2021	<ol style="list-style-type: none"> 1. IMTM will choose a person who will take care of the trainee during his/her visit. 2. For 2 weeks exchanges IMTM prefers if the trainee can join the everyday tasks. To a trainee with a small project, we recommend a longer visit. 3. A trainee will deepen his/her knowledge of the IMTM HTS platform and chemical library with a focus on a selected training activity: <ul style="list-style-type: none"> - compound management (compound registration and storage, source plates preparation and storage of source plates, replicates and assay plates, liquid handling) - process automation (introduction to the robotic platform, software for the controlling of automation, scheduling, connection of robotics with the liquid handlers, readers, incubators, microscopes, optimisation and scheduling of the processes) - assay development (miniaturization of the assay, plate design, positive and negative controls selection, validation of the assay, basics of data transfer and analysis) - high throughput screening (introduction to the robotic platform, design of the protocols for assays implemented into HTS, key conditions and scheduling)
TUM	other (chemoproteomics)	February-April; and August-October	TUM prefers to host someone with his/her own small (chemo)proteomic project. The trainee could bring own samples and prepare them in TUM's lab using standard proteomic workflows. After measurement, TUM staff will teach the trainee on how to use the software tool Perseus and optionally their in-house data processing pipelines for data analysis.
Weizmann	Medicinal chemistry strategies	Flexible	The medicinal chemistry group in the Weizmann institute will host a trainee for up to 2 weeks. During this period, the trainee will be assigned to a senior synthetic organic chemist. Ideally, the trainee will have experience in organic synthesis such that he/she will be able to take advantage of the resources available in our facility (flash purification, hydrogenation, LC-MS, mass-triggered LC, NMR). Ideally, two or three preliminary discussions will be held with the trainee to clarify goals and finalize a realistic plan for the two-week visit. Additionally applications such as HT click chemistry synthesis and covalent fragment screening can be performed with our routine operations.

Moreover, some of the training institutions such as MEDINA, USC or UiO have connections to the industry and are participants in WP7 (Industry Engagement). Capitalising on their collaboration with industry partners, WP8 will work together with WP7 with the aim to train staff on new



technologies and innovative techniques that have been established and implemented within the engagement of our partners with specific industries.

2.1.3.2 Staff exchanges: visiting trainees

Due to the COVID-19 outbreak and related travel restrictions, the call for trainees interested in visiting hosting institutions was postponed from February 2020 to September 2020. Applicants will apply for one of the available hosting institutions listed in Table 2. As the call is intended for DRIVE staff, it will only be announced within the DRIVE community and not to a wider community. Potential trainees will have to submit a proposal, which should include the following points:

- CV
- PI recommendation
- motivation letter to explain the reason to attend this specific type of training (project related or general interest in the technology)
- preferential training institution (including the explanation of the particular chosen training institution; a second and the third choice for other sites should be indicated in case the first choice is not available)
- project annotation (this point is optional)

For the evaluation of the call, the EU-OPENSSCREEN ERIC training call procedure will be applied. An evaluation committee will select the trainees and the visits will be organised according the hosting sites' availabilities starting from January 2021. Details on the EU-OPENSSCREEN ERIC training courses, are constantly updated on the EU-OPENSSCREEN ERIC [training section website](#).

2.1.4 Short-term staff exchange budget

Each of the training institutions has been allocated funds to host a visiting trainee. The amount should be used to cover the complete exchange period. Due to the differences of costs in particular countries the possibility of in kind contributions by particular training sites must be considered.

2.2 Summer schools and links to national and international training networks

One summer school on chemical biology and drug discovery will be organised in 2021/2022. Several links to national and international training activities will be established within the duration of the DRIVE project. The cooperation of EU-OPENSSCREEN ERIC with other LS RIs will be exploited to drive forward collaborative training and educational activities to bring together a vast range of expertise in the life science community, from structural biology to translational medicine. The detailed report on those activities will be published in deliverable 8.3 as examples of newly established collaborative links.



3 Conclusions

During the first 18 months of the EU-OPENSREEN-DRIVE project we have developed a training timeline of webinars, on-site courses and short-term staff exchange, which add and/or complement the already existing training program offered by EU-OPENSREEN ERIC. Thanks to the great cooperation of EU-OPENSREEN-DRIVE partners, some of the training activities have already been realised.

The EU-OPENSREEN-DRIVE training program fills a gap in scientific education with regard to systematic approaches for better understanding of complex biological systems. Systematic and broad approaches need a high level of automation in order to be handled and analysed. As process automation, HTS and compound management are not regular subjects in chemistry or biology classes at universities, and this knowledge is normally only collected and taught at respective HTS platforms. The development and training of future partner sites from non-member ERIC countries will have an important role in the planned extension of ERIC membership.

Most of the suggested training activities rely on traveling and due to the COVID-19 outbreak and related travel restrictions, these activities have been postponed. We hope that the epidemiological situation will improve and we will be able to restart the timeline. In fact, this specific situation of emergency and quarantine has shown the need for online training tools. The enormous interest in the webinar “Introduction to HTS” endorses this point.

The EU-OPENSREEN-DRIVE training program will be constantly updated. We will monitor the outcome of the first EU-OPENSREEN-DRIVE program prepared for years 2020/2021 and based on that, we will revise the offered courses and tailor them for the needs of our community preparing a tailored program for years 2021/2022.



4 Annex 1: Training Plan Form

1. NAME OF THE TRAINING SITE

Click or tap here to enter text.

2. EXPERTISE *(please select the training activity. Choose one preferential and one or more optional activity, which should address one of the following areas)*

- compound management and use of EU-OPENSSCREEN library
- process automation
- assay development
- high throughput screening
- screening data analysis and data transfer
- database usage and linked IT processes
- medicinal chemistry strategies
- other

3. WHEN *(please specify your time preferences of a possible trainee visit (month, year). The visit of a trainee should last at least 2 weeks, but it can be longer)*

Click or tap here to enter text.

4. DETAILED TRAINING PLAN *(please suggest a brief training plan for these two weeks. The plan should include:*

- *If your site will dedicate a person, who will take care of the trainee during his/her visit.*
- *If you prefer to host a trainee with his/her own small project OR If you prefer to host a trainee, who will join the everyday tasks of your site with the permanent supervision from your side)*

