



## D8.1

# Report on available courses relevant for users and staff of EU-OS

for

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(Development and long-term sustainability of new pan-European research infrastructures)

Research and Innovation Action (RIA)

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EU-OPENSSCREEN-DRIVE

Action Full Title:

“Ensuring long-term sustainability of excellence in chemical biology within Europe and beyond”

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# 1 Introduction

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

The aim of EU-OPENSREEN is to develop novel chemical compounds that exhibit specific biological responses to organisms, cells or cellular components in a well-defined, specific process in collaboration with external researchers. These chemical 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 applies screening of collections of >100,000 compounds, by using high-throughput screening platforms in an automated process, and subsequent hit-to-probe optimization to develop these chemical probes.

The three main user communities of EU-OPENSREEN are:

- Biologists who wish to develop suitable assays that are amenable to screening and who 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 joints together 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.

A prerequisite for the successful operation of the EU-OPENSREEN ERIC is an 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.

Our training dedicated work-package (WP) has the following main objectives:

- to identify training gaps and 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 a **service-oriented mission to staff and management of EU-OPENSREEN**
- to use **modern training tools** as part of training delivery (eLearning etc.)
- to improve **integration into existing European training programs**.

Intended for users, researchers and industrial representatives, the proposed EU-OPENSREEN-DRIVE training program will *i)* bring together specialized partner sites and their excellent 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 any educational gaps at single sites. This program will enable the engagement of highly skilled and trained users, with the infrastructures and services offered by EU-OPENSREEN. The more experienced users will



gain better awareness of chemical biology, infrastructure services, and 'will be able to more appropriately formulate their requests for infrastructure services' in the future. 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 (Figure 1) for users and EU-OPENSSCREEN staff will be based on:

- **Web-based activities** such as live web-based video courses (webinars) or web-based theoretical 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 prioritize 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 organizes bioinformatics and data science-related workshops and courses etc and other national and international training initiatives.

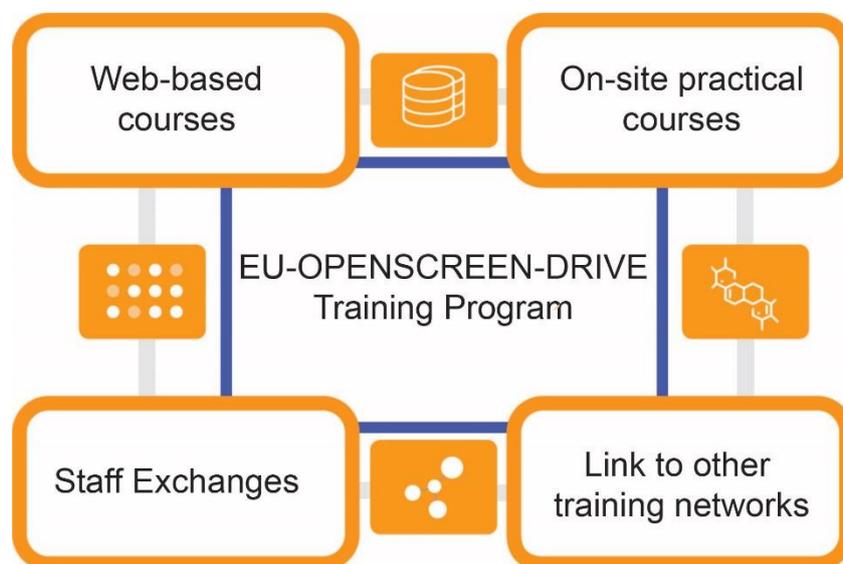


Figure 1 Schematic representation of EU-OPENSSCREEN-DRIVE training program covering EU-OS core expertise in small molecule screening, medicinal chemistry, and database usage together with additional areas such as chemoproteomics and fragment-based screening.

EU-OPENSSCREEN-DRIVE training focuses on different areas of the early drug discovery cycle going from compound management, process automation, assay development, high-

throughput screening, screening data analysis and data transfer, database usage and medicinal chemistry optimisation. Moreover, DRIVE plans to offer additional specialized training courses on fragment screening and target identification so new capabilities of the research infrastructures will be transferred from expert to emerging sites and then on to external users. Also, a specialised course on advanced data mining and machine learning will be organized in connection with the database dedicated work-package WP6.

This deliverable “*Report on available courses relevant for users and staff of EU-OPENSSCREEN*” relates to task 8.1 “Organize 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 12 months of the EU-OPENSSCREEN-DRIVE project, while discussions on future training activities will continue.

In the following sections, we report on i) the methodology adopted to map the available courses within the EU-OPENSSCREEN-DRIVE community and external courses and training opportunities in chemical biology and drug discovery fields together with a list of available courses, ii) the training offers at EU-OPENSSCREEN ERIC and iii) the future EU-OPENSSCREEN-DRIVE training program for users and EU-OPENSSCREEN staff.



## 2 Methodology adopted to map available training courses (survey, web-mining)

### 2.1 Survey on available courses within the EU-OPENSREEN-DRIVE community

In order to identify and evaluate existing courses at partner sites, a web survey entitled: “Available courses and training programs” was prepared and distributed to the EU-OPENSREEN-DRIVE participants. The survey consists of 9 questions (listed in 2.1.1) and it maps currently available courses.

#### 2.1.1 Survey questions

1. *Please indicate your institution name and your name.*  
Click or tap here to enter text.
2. *Does your institution/department/screening center provide a formal training program e.g. theoretical and practical courses/workshops on screening and relevant topics and technologies?*  
 yes  
 no  
*If yes, briefly describe the program by answering the following questions.*
3. *Are the courses open for everyone (with relevant experience)?*  
 for everyone  
 for internal staff and staff from other screening centers only  
 for internal staff only  
*Comments:*  
Click or tap here to enter text.
4. *How is the course/workshop organized?*  
 in-house (by your own institution/department/screening center)  
 by external providers  
*Comments:*  
Click or tap here to enter text.
5. *How is the course financed?*  
 fully funded  
 fees  
 both options
6. *What is the title of the course(s)/workshops?*  
Click or tap here to enter text.
7. *In which language are the courses/workshops held?*  
Click or tap here to enter text.
8. *What is the maximum or typical number of participants?*  
Click or tap here to enter text.
9. *How often are the courses/workshops given?*  
Click or tap here to enter text.



## 2.1.2 Survey results

All DRIVE participants were invited to complete the survey online on the DRIVE SharePoint. The total number of DRIVE institutions participating in the survey was **30** (out of 34 institutions), **21** of which are EU-OPENSSCREEN partner sites. Half of the institutions (15/30) provide formal training opportunities on screening and relevant topics and technologies, while the remaining 15 institutions do not provide targeted training activities as standard institutional asset. Main results collected through the survey are summarized in Figure 2 and Table 1.

Q2: does your institution/department/screening center provide a formal training program e.g. theoretical and practical courses/workshops on screening and relevant topics and technologies?

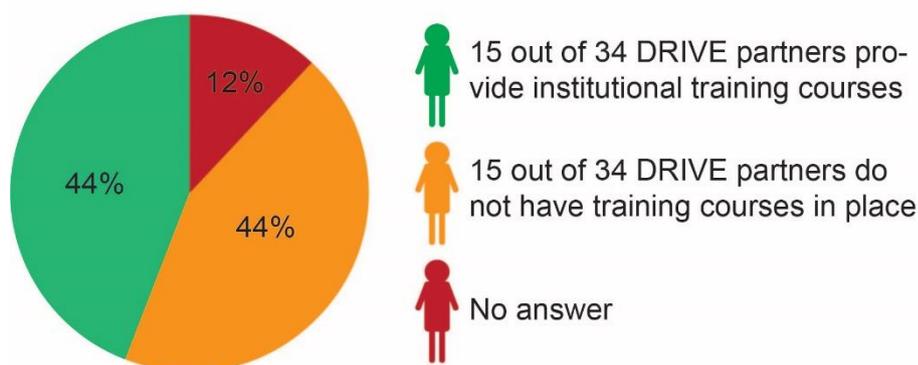


Figure 2 Overview of EU-OPENSSCREEN-DRIVE partners providing formal training activities.

The offered training opportunities range from regular annually given courses/trainings, which are implemented in master and doctoral universities' program, to individual customized workshops mainly in the field of High Throughput Screening (HTS) and compound management and data analysis (18 training activities out of 25 reported in Table 1). From such analysis, it is visible that theoretical and practical trainings on assay development, automated screening including high-content screening, and data analysis are well established within the network, while courses on lead optimisation are less present. Moreover, partners at TUM offer their expertise in novel services related to chemical proteomics, which is of benefit for screening and medicinal chemistry sites to be trained and complement their expertise on new techniques as well as for external researchers new to the field of chemical proteomics. DRIVE partner EMBL Grenoble (France) is part of the Europe's flagship laboratory for the life sciences – an intergovernmental organisation with more than 80 independent research groups covering the spectrum of molecular biology with a well-established [EMBL International Centre for Advanced Training \(EICAT\)](#). The EICAT promotes advanced training activities between the EMBL sites including its sister institution [EMBO](#), as well as between EMBL sites and research organisations in the EMBL member states.

Only part of the courses listed in Table 1 are open to everyone (approx. 10), while the rest are organised and implemented for the institutional staff only.

In order to get a better picture of the actual existing training opportunities in the field of chemical biology in Europe, we decided to perform a web mining on training programs organized outside the DRIVE community (section 2.2).

Table 1 Summary of training programs available and organized by EU-OPENSSCREEN-DRIVE institutions.

Entry	EU-OPENSSCREEN-DRIVE partner (partner acronym) - country	EU-OS Partner site	Title of course/training program	Short description of the course/training program	Topic*
1	EU-OPENSSCREEN ERIC	Yes (central hub)	N/A: EU-OPENSSCREEN training program	EU-OS <a href="#">training program</a> comprises practical and web-based modules to provide training opportunities for managers, service and technology providers and users.	CM, O, S
2	Palacky University in Olomouc, Faculty of Medicine and Dentistry, Institute of Molecular and Translational Medicine (IMTM) – Czech Republic	Yes	N/A	IMTM has experience in organizing satellite workshop focused on high-content screening (HCS). The workshop is usually for conference participants.	S
3	Helmholtz-Zentrum für Infektionsforschung GmbH (HZI), Department of Chemical Biology (CBIO) – Germany	Yes	N/A	Courses at HZI are performed within teaching duties and they are internally organized for 6-10 attendees.	S

4	Fraunhofer IME ScreeningPort (IME) – Germany	Yes	<i>Workshop on Pre-clinical Drug Discovery: Exploring in-vitro biochemical approaches and cellular assays and their utility in High Throughput Screening</i>	The course is given annually in English for a maximum of 20 attendees and it is open to everyone.	S
5	Fundación MEDINA (MEDI) – Spain	Yes	<i>Introduction to High Throughput Screening</i>	Courses are open to everyone with relevant experience in the field and are those related with specific technologies. Introductory courses are open to scientists and students without previous experience. They are organized internally from a selection of topics to be covered, or they can be implemented custom made for individuals or groups interested in specific technologies. The courses are financed by fees, and given in English for a maximum of 15-20 attendees. The courses are given annually.	S
			<i>Use of metabolomics in biomarker discovery</i>		O
			<i>High content imaging and phenotypic screening</i>		S
			<i>Introduction to safety and toxicology preclinical screening</i>		S
			<i>Compound management and data analysis</i>		CM
			<i>High throughput discovery of new anti-infectives</i>		S

6	Centro de Investigación Príncipe Felipe (CIPF) – Spain	Yes	<i>N/A: CIPF training and education program</i>	Internal CIPF courses are usually held annually in Spanish for approx.15 attendees intended for the CIPF staff only. Those are not specific courses on screening. However, the training program is based on different disciplines that can be applied or used in the screening site (such as statistics, cytomics, specific software use e.g. Image J, etc.).	0
			<a href="#"><u>Master's Degree in Biomedical Research</u></a>	The master program in Biomedicine is organized in collaboration with the University of Valencia. In this master course the department of Advanced Therapeutics is teaching different modules from drug discovery, enzymatic assays, cell biology, exosomes, 3D models or nanomedicines. This course is only for master students.	0
			<i>International Conference on Polymer Therapeutics: From Lab to Clinical Practice</i>	With focus on nanomedicine-drug delivery and Polymer Therapeutics this conference is organized every two years and held in English for a max of 200 attendees.	0
			<i>N/ A: other training activities and conferences</i>	In addition, training courses, scientific conferences and seminars are periodically organized by CIPF and are extended to all scientists, worldwide (e.g. Spanish Drug	0

				Discovery Network Conference organized every year with approx. 120 attendees)	
7	University of Santiago de Compostela (USC) – Spain	Yes	<i>Target validation and drug screening</i>	The course is imparted to post-graduate students in the University training program in drug research and development. The course is given annually in Spanish language for a maximum of 20 attendees and a fee is charged.	S
8	University of Helsinki (UH) – Finland	Yes	<i>Bioactivity screening and assay development</i>	The three courses are organized as part of both, undergraduate and doctoral student programmes (these students have priority access, but others can join if places are available) by the university staff and some invited speakers. The courses are given in English, annually and for 5-30 attendees depending on the course. More information can be found <a href="#">here</a> .	S
			<i>High-content screening</i>		S
			<i>Reporters in pharmacology</i>		S
9	Institute of Bioorganic Chemistry Polish Academy of Sciences (IBCH PAS) – Poland	Yes	N/A	At the moment trainings at IBCH PAS include setting up an assay and adapting it to high throughput screening and they are directly aimed at personnel or potential users (usually done also one-to-one).  Training courses on a) <i>assay development</i> and b) <i>screening</i> are planned for 2021.	S

10	Spanish National Research Council (CSIC) – Spain	Yes	<i>Drug Discovery: Paracetamol Synthesis workshop</i>	As part of the training in Drug Discovery Strategies and Drug Development to the Clinical Trials, this is a one-day workshop with a lecture of one hour followed by an experimental workshop on the synthesis of Paracetamol. The workshop is open to everyone and it is organized twice a year for 4-24 attendees. The course language is English.	M
11	Technical University of Munich (TUM) – Germany	No	<i>European Summer School - Advanced Proteomics</i>	The summer school is co-organized by TUM, University of Utrecht (NL), University of Oxford (UK), and MPC - Medical Proteome Center (DE). It is open to everyone, mainly suited for people new to the field of proteomics. It is given in English and organized every year during the first week of August for a maximum of 100 attendees.	O
12	Institute for Molecular and Cell Biology, University of Porto (IBMC) – Portugal	No	<a href="#"><u>High Content Screening (HCS) and Image Analysis for BioSciences</u></a>	Organized together with the Instituto de Investigação e Inovação em Saúde, Universidade do Porto (i3S) the course is designed to graduate students, and early career investigators (open to everyone). The course includes a theoretical part and hands-on sessions with HTS and HCS instruments and open-source software for image and data analysis. It is given in English and organized yearly for approx. 20 attendees (a fee applies).	S

13	Weizmann Institute – Israel	No	<i>High Throughput Screening methodologies</i>	This fully-funded course is organized in-house and open for everyone. It is given in English and organized annually for a maximum of 20 attendees.	S
14	École polytechnique fédérale de Lausanne (EPFL) – Switzerland	No	<a href="#">Lab methods: bioactive compounds screening (BIOENG-512)</a>	The course gives an introduction to the key principles and concepts underlying the screening activity to identify and to characterize bioactive compounds acting on a given biological target or a signalling pathway. It is a 1-week workshop organized every year in Autumn and open to EPFL students and case by case to Master students from other Swiss Universities (in general, the Pharmacy School at Geneva). The course booklet can be found <a href="#">here</a> .	S
15	Leibniz Research Institute for Molecular Pharmacology (FVB-FMP)/MDC Berlin, Chemical Biology – Screening Unit – Germany	Yes	<i>Automated data documentation &amp; analysis in HTS</i>	This course provides a hands-on training in actual running workflows with explanation how it is set up. It is given in English and organized on demand, typically for 2 attendees.	S

\*S= Screening including assay development, data processing and control software; CM= Compound management and data analysis; M= medicinal chemistry optimization; O= other including chemoproteomics, fragment-based screening etc.

## 2.2 Courses available outside the EU-OPENSSCREEN-DRIVE community

With the aim of mapping the available courses in the field of chemical biology outside our EU-OS DRIVE community, and to build a strong training program for our partner sites and external users, we performed a web mining focused on the availability of these courses around Europe.

The training opportunities available outside the DRIVE community are quite broad and can be divided into several categories:

- Online training activities
- On-site courses
- Summer schools
- Training programs at universities.

The web mining results have been sorted per category and discussed in detail in the following sections.

### 2.2.1 Online training activities

#### Training provided by EMBL-EBI

[The European Bioinformatics Institute](#) (EMBL-EBI) provides free online live seminars (webinars) on Europe's most widely used data resources, created by experts at EMBL-EBI and collaborating institutes. The seminars offer brief introductions to a range of databases and more in-depth coverage of new features and tools to assist the attendees in their research. Each webinar is delivered by an EMBL-EBI expert and is followed by a question and answer session. The webinars are recorded and continue to be freely available through the "Train online"- program available at their [webpage](#). The searchable list of the upcoming courses are available [here](#), while past webinars are available without any registration [here](#).

#### Training provided by the Chemical Biology Consortium Sweden

This Consortium offers a web-based theoretical course "[Introduction to high throughput screening](#)" The course includes a description of small organic molecules as research tools and starting points for drug development. It also describes development of robust and statistically validated test systems that allow biological activity to be measured by e.g. luminescence, absorbance, or fluorescence. The course also covers how HTS is performed and how molecules that are identified as potentially actives are followed up by analysis of analogs and additional test systems. HTS generates large amounts of data and the course briefly reviews the important role that an informatics system has. The registration is required for this course and the attendees can conduct the exam in form of a web-based test.

#### Other trainings

Several other online training tools on chemical biology were identified during the web mining. These webinars are rather sporadic, prepared only once by individual researchers. Examples of a complex webinar might be:



- [HTS and the drug discovery, Assay Development and Optimization, HTS operational process](#) organized by the Southern Research as part of the [CCTS drug discovery seminar series](#).
- [Introduction to drug discovery, including Screening for Compounds, hit identification](#) organized by [iBiology](#). iBiology's mission is to convey, in the form of open-access free videos, the excitement of modern biology and the process by which scientific discoveries are made.
- [Assay guidance manual training workshops, online training modules](#) organised by NIH National Center for Advancing Translational Sciences.

### Other trainings organised by companies

On the other hand, companies offer a number of webinars and tutorials:

- Labcyte Inc., a global biotechnology company and a leader in acoustic liquid handling technology, [offers a platform for webinars and tutorials](#) from different sources.
- Charles River offers a [webinar on high-throughput-screening](#) or a [webinar on compound collections](#) as part of their [extensive training offers](#).
- Promega offers a large set of [free educational webinars](#) in the fields of chemical biology and drug discovery.

### 2.2.2 On-site courses

Examples of on-site courses on chemical biology organized in the past and 2020 in Europe are listed in Table 2. The implementation of those courses is currently uncertain due to the [COVID-19 outbreak](#). Some of those courses might be offered as online alternative.

Table 2 On-site courses on chemical biology.

Organizer	Status (date)	Title of the course	Short description of the course
Portuguese Platform of Biolmaging	upcoming (July 14-17, 2020)	<i>Workshop on Biolmage Analysis for High Content Screening</i>	Fundamentally practical, in this modular course, participants will get acquainted with several open-source image analysis software (ImageJ/Fiji, ilastik, CellProfiler, CellProfiler Analyst, Cytoscape and IDEAS®) designed to deal with large amounts of images. Experimental data will be used as datasets for image segmentation and quantification. Link to the course can be found <a href="#">here</a> .
EMBL	upcoming (September 2 - 5, 2020)	<i>Chemical Biology 2020</i>	EMBO workshop spans from tool development to biological applications, from computational drug design to synthetic chemistry. Link to the course can be found <a href="#">here</a> .



Chemical Biology Consortium Sweden	periodically	<i>Assay development in high throughput screening</i>	The course gives a practical basis for assay development in high throughput screening. The course is given as complement to the theoretical on-line course "Introduction to high throughput screening" (see above). Passed examination of the theoretical course is a prerequisite for taking the practical. Link to the course can be found <a href="#">here</a> .
EMBL	past (October 23 - 25, 2018)	<i>Assay Development for Drug Discovery and Characterization</i>	In this course EMBL has explored the utilization of cell-based technologies in the drug discovery process for small molecules, biologics and cell therapy. Additionally, this program provided hands-on experience of both the IncuCyte® S3 Live-Cell Analysis System and the iQue Screener PLUS platform to enable insight into cell-based experimental design and analysis. Link to the course can be found <a href="#">here</a> .
IME, Hamburg	past (December 5-7, 2018)	<i>CA15135 multi-targeting Biophysical Training School</i>	The course aimed to explore the principles underlying target identification, biochemical and cell-based assay development, small molecule screening and in vitro ADME-Tox profiling as part of lead optimization to endow compounds with multi-targeting activity. Link to the course can be found <a href="#">here</a> .
NCCR Chemical Biology (Swiss National Centre of Competence in Research)	past (November 20 - 22, 2018)	<i>Workshop: Image-based high-throughput screening</i>	The program of the workshop includes: demo of robotic tools, fixation and labeling of cells with antibodies using automated plate washers, image acquisition using the automated microscope ImageXpress® Micro XL and image analysis using Biocomputing tools (Custom Module Editor, AcuityXpress™). Link to the course can be found <a href="#">here</a> .

### 2.2.3 Summer schools

Two summer schools relevant for users and staff of the EU-OPENSSCREEN-DRIVE community will be organized in 2020 and 2021:

- *Summer School in Computer-Aided Drug Design* (July 20 – 25, 2020, Pisa, Italy) organized by the University of Pisa. This summer school will cover all the main computational techniques used in drug discovery, supplying a basic level of knowledge of this research field. Link to the school can be found [here](#).
- *Medicinal Chemistry Residential School 2021* (June 7 – 11, 2021, Loughborough, United Kingdom) organized by the Royal Society of Chemistry. This school will cover topics of interest to drug discovery researchers, helping to increase understanding of the factors governing modern drug discovery from the initial concept through to translational science and intellectual property. Link to the school can be found [here](#).



## 2.2.4 Training programs at universities

Many European universities offer master programs focused on chemical biology, drug discovery and bioinformatics. Master students graduating from these programs have the opportunities to continue at the postgraduate level in these fields as well. These master programs are quite often jointly organized by several universities together with local research institutions. Such connections strengthen the links between the universities and research institutions. While the universities provide tuition, the research institutions cover the practical on-site training. Examples of such programs are listed in Table 3.

Table 3 University training programs

University name	Program provided	Program link
University of Chemical Technology (UCT), Prague - Czech Republic	Bachelor, Master and Ph.D. study in Bioinformatics	<a href="http://studuj.bioinformatiku.cz/">http://studuj.bioinformatiku.cz/</a>
Uppsala University – Sweden	Chemical Biology - Master's Programme in Chemistry	<a href="https://www.uu.se/en/admissions/master/selma/program/?pKod=TKE2M&amp;pInr=KEBI&amp;lasar=20%2F21">https://www.uu.se/en/admissions/master/selma/program/?pKod=TKE2M&amp;pInr=KEBI&amp;lasar=20%2F21</a>
University of Geneva and EPFL – Switzerland	Master degree in Chemical Biology	<a href="https://nccr-chembio.ch/education-training/">https://nccr-chembio.ch/education-training/</a>
University of Santiago de Compostela (USC) – Spain	Doctoral Programme in Drug Research and Development	<a href="https://www.usc.gal/en/studies/doctoral-programme/health-sciences/doctoral-programme-drug-research-and-development">https://www.usc.gal/en/studies/doctoral-programme/health-sciences/doctoral-programme-drug-research-and-development</a>
University of Helsinki (UH) – Finland	Doctoral Programme in Drug Research	<a href="https://researchportal.helsinki.fi/en/organisations/doctoral-programme-in-drug-research">https://researchportal.helsinki.fi/en/organisations/doctoral-programme-in-drug-research</a>
Ludwig-Maximilians-Universität München – Germany	International Research Training Group on Chemical Biology of Epigenetic Modifications	<a href="https://www2.daad.de/deutschland/studienangebote/international-programmes/en/detail/6145/#tab_overview">https://www2.daad.de/deutschland/studienangebote/international-programmes/en/detail/6145/#tab_overview</a>
University of Oxford – United Kingdom	Master by Research in Chemical Biology	<a href="https://www.ox.ac.uk/admissions/graduate/courses/msc-research-chemical-biology?wssl=1">https://www.ox.ac.uk/admissions/graduate/courses/msc-research-chemical-biology?wssl=1</a>
University of Leeds, School of Chemistry – United Kingdom	Master in Chemical Biology and Drug Design	<a href="https://courses.leeds.ac.uk/f985/chemical-biology-and-drug-design-msc#section3">https://courses.leeds.ac.uk/f985/chemical-biology-and-drug-design-msc#section3</a>
University of Leeds, School of Chemistry – United Kingdom	Postgraduate course in Chemical Biology and Drug Design (Taught)	<a href="https://digital.ucas.com/courses/details?coursePrimaryId=3731d7c3-d3d1-30e3-52b4-fa88e5db5965&amp;courseOptionId=dd03c97">https://digital.ucas.com/courses/details?coursePrimaryId=3731d7c3-d3d1-30e3-52b4-fa88e5db5965&amp;courseOptionId=dd03c97</a>

		<a href="https://www.ed.ac.uk/studying/postgraduate/degrees/index.php?r=site%2Fview&amp;iid=3&amp;utm_source=Findamasters&amp;utm_medium=programme&amp;utm_campaign=ExternalListings&amp;utm_content=WebsiteURL">9-8137-4f15-935d-01976e3a4eae&amp;academicYearId=2020</a>
University of Edinburgh – United Kingdom	Master and postgraduate programme in Drug Discovery and Translational Biology	<a href="https://www.ed.ac.uk/studying/postgraduate/degrees/index.php?r=site%2Fview&amp;iid=3&amp;utm_source=Findamasters&amp;utm_medium=programme&amp;utm_campaign=ExternalListings&amp;utm_content=WebsiteURL">https://www.ed.ac.uk/studying/postgraduate/degrees/index.php?r=site%2Fview&amp;iid=3&amp;utm_source=Findamasters&amp;utm_medium=programme&amp;utm_campaign=ExternalListings&amp;utm_content=WebsiteURL</a>
Imperial College London, Institute of Chemical Biology Centre of Doctoral Training Renewal – United Kingdom	Multidisciplinary chemical biology research and life science innovation trainings	<a href="https://www.imperial.ac.uk/news/190249/institute-chemical-biology-centre-doctoral-training/">https://www.imperial.ac.uk/news/190249/institute-chemical-biology-centre-doctoral-training/</a>

Other national organisations offer training courses in the field of chemical biology, such as the [Drug Discovery Hub Dortmund](#).

### 2.2.5 Training opportunities in the United States

Exemplary courses in the field of chemical biology, which are available in the United States can be found in Table 4 Training opportunities in the United States Table 4 below.

Table 4 Training opportunities in the United States

University name	Program provided	Program link
Chemical Biology Graduate Programs in the United States	Chemical Biology Graduate Programs	<a href="https://study.com/articles/chemical_biology_graduate_programs.html">https://study.com/articles/chemical_biology_graduate_programs.html</a>
Chemistry-Biology Research Training Program Institutions in the United States	Chemistry-Biology Interface Research Training Program Institutions	<a href="https://www.nigms.nih.gov/maps/Pages/Chemistry-Biology-Interface-Research-Training-Program-Institutions.aspx">https://www.nigms.nih.gov/maps/Pages/Chemistry-Biology-Interface-Research-Training-Program-Institutions.aspx</a>

### 3 Training program available at EU-OPENSSCREEN ERIC

Starting from 2019 EU-OPENSSCREEN ERIC offers a training program with the prime objective to actively support and engage with the Chemical Biology community by identifying gaps in the currently available offerings and by accordingly implementing courses and staff exchanges.

EU-OPENSSCREEN will fund dedicated training programs in 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 and
- medicinal chemistry strategies
- project management

EU-OPENSSCREEN partner sites that wish to offer training courses and webinars and having a proven track record/expertise in one of the above-mentioned areas of interest as well as scientific staff from EU-OPENSSCREEN partner sites and the EU-OPENSSCREEN ERIC central office wanting to take part in staff exchanges and benefit from external courses in the field of chemical biology are invited to apply for EU-OPENSSCREEN ERIC training funds. EU-OPENSSCREEN ERIC makes available 100 k€/ year for the organisation and implementation of training activities.

This training program covers four different categories to which applicants can apply:

- training course (theoretical or practical, the course can host 10-20 attendees for a duration of 1 – 5 days)
- webinars (online course that can host up to 100 attended for a duration of 1h – 1day)
- external courses (e.g. participation in an external course/training)
- staff exchange (this training program is dedicated to the EU-OPENSSCREEN staff which would benefit from visiting another EU-OPENSSCREEN ERIC partner site).

The call for training proposal is advertised to the ERIC partner sites through internal mailing lists.

The application submission is done via a dedicated email [training@eu-openscreen.eu](mailto:training@eu-openscreen.eu) using a training application form which is available upon request. Once submitted, proposals will be evaluated on pre-defined criteria, and applicants will be informed about the results. Successful applicants should then implement the approved training activities within one year of acceptance.

EU-OPENSSCREEN training calls are organized yearly. Once accepted the courses will be advertised openly on the EU-OPENSSCREEN ERIC website and other social media channels.

Currently available training opportunities are advertised [here](#).



## 4 EU-OPENSREEN-DRIVE future training activities

The results obtained from the surveys and the web-mining indicate that a number of courses and training programs in chemical biology and drug discovery offered by both DRIVE institutions and outside DRIVE community exist. The training opportunities offered by DRIVE institutions range from regular annually given courses, which are imparted in master and doctoral universities' programs, to individual one-time only organized workshops. The regular annually organized courses are actually 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 specialized partner sites and their excellent knowledge and create and prepare a web-based educational platform of the following **webinars**:

- *Introduction to High Throughput Screening*
- *Tool compound and probe evaluation and selection*
- *Introduction to chemo-sensitive profiling*
- *Open access principles*

The online webinars will be recorded and placed on the DRIVE and EU-OPENSREEN webpages for future viewing. Our library of webinar recordings will be free and accessible to everybody.

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

- *Compound logistics*
- *Assay development*
- *Data mining*

**One summer school** on chemical biology and drug discovery will be organized in 2021.

**Short-term staff exchanges** will be organised with the aim to train screening centre and medicinal chemistry staff on new techniques which are part of novel EU-OPENSREEN services related to chemical proteomics, structure-based drug discovery, target-identification. Trainees are staff from partner institutions in ERIC member and non-member countries and the duration of the exchanges will be approx. 2 weeks. Moreover, staff exchanges will be beneficial for sites in new/future ERIC member countries, which might not yet be as technically advanced as the founding partner sites.

A detailed description of the courses in the EU-OPENSREEN-DRIVE training program will be given in Deliverable 8.2 "Report on newly developed courses organized by EU-OS-DRIVE" due in month 18.



## 5 Conclusions

During the first 12 months of the EU-OPENSREEN-DRIVE project we analysed the already existing training opportunities for external users and our EU-OPENSREEN staff members in order to prepare and plan a tailored training program for the needs of our user community, our EU-OPENSREEN researchers, and staff.

In fact, users will receive practical training on assay development, automated screening, lead optimization and data analysis. Quality training will empower users to establish new best practice methods at their own facilities. On-site training will be supplemented with webinars, and e-courses accessible via the EU-OS website and made available online to a broader audience. Specialized training courses on fragment screening and target identification will be planned so new capabilities of the RI are transferred from expert to emerging sites and then on to external users. A specialized course on advanced data mining and machine learning will be organized in connection with the data-base dedicated work-package (WP6). In addition, advanced training of ERIC managers is foreseen as important measure to ensure scientific and financial sustainability. More details about those training courses will be published in deliverable 8.2 “Report on newly developed courses organized by EU-OS-DRIVE”.

