swiTTreport 2022

SWISS TECHNOLOGY TRANSFER REPORT

swiTT
swiss technology transfer association

CASE STUDY

Empa
Materials Science and Technology

Swiss Cluster

SWISS CLUSTER – INNOVATIVE COATING SYSTEM

Problem – Challenge

Thinfilm multilayer structures can combine the properties of different materials in a complementary way; they are currently a research area of great interest. As different coating techniques need to be combined to produce multilayer structures, the product to be coated needs to be moved back and forth between different processing chambers, and the integrity of the high vacuum atmosphere is broken in every cycle. Accordingly, the conventional preparation procedure is time and cost intensive.

Solution

The Empa Spin-off Swiss Cluster AG offers an innovative coating system named SC-1.

The system combines two coating methods in one device, without moving the substrate: atomic layer deposition (ALD) and physical vapor deposition (PVD). It allows to prepare multilayer structures consisting of alternating thin layers to be produced quickly and cost-effectively. The technology was developed in Empa's Mechanics of Materials and Nanostructures laboratory, and Empa filed a patent application for it and licensed the technology exclusively to Swiss Cluster AG in 2020.

Currently, a team of six is also designing and constructing adjusted systems for large corporate customers based on ALD and PVD technologies. Selling individual components, providing technical support and research support services round out the young company's portfolio.

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SUMMARY

The annual survey "swiTTreport" is the most comprehensive analysis of the technology transfer activities of Swiss public research organisations (PRO). The report covers two main areas, a) research contracts of the participating institutions with private or public partners, and b) the activities for the economic exploitation of research results from these institutions. The Swiss PRO interact actively with partners in the economy. These activities are collectively designated in the report as "technology transfer" (TT) activities.

Data on technology transfer activities from seven cantonal universities and the two Federal Institutes of Technology (collectively Universities), from three universities of applied sciences (UAS), and three research institutions of the ETH domain (RI) were available for this year's report.

Overall, the respondents reported the following indicators on technology transfer activities in 2021:

3468	New Research Projects
622	Invention Disclosures
335	Priority Patent Applications
215	License & Option Agreements
83	Start-Ups founded

RÉSUMÉ

La présente analyse est la plus exhaustive connue sur les activités de transfert de technologies réalisées par les institutions publiques de recherche suisses. Le rapport couvre deux aspects principaux: les contrats de recherche de ces institutions avec des partenaires privés ou publics et les activités liées à la valorisation des résultats de recherche obtenus par ces institutions. Les dernières interagissent activement avec le secteur privé. Ce rapport désigne collectivement ces collaborations et activités de valorisation sous les termes de transfert de technologies (TT).

Ces données proviennent de sept universités cantonales et deux Ecoles Polytechniques fédérales (Universités), de trois universités de sciences appliquées (UAS) et de trois institutions de recherche dans le domaine des Ecoles Polytechniques Fédérales EPF (RI).

Dans l'ensemble, les personnes interrogées ont communiqué les chiffres clés suivants sur les activités de TT en 2021:

3468	Nouvelles collaborations de recherche
622	Déclarations d'invention
335	Demandes de brevets
215	Contrats de licence et accords d'option
83	Créations de start-ups

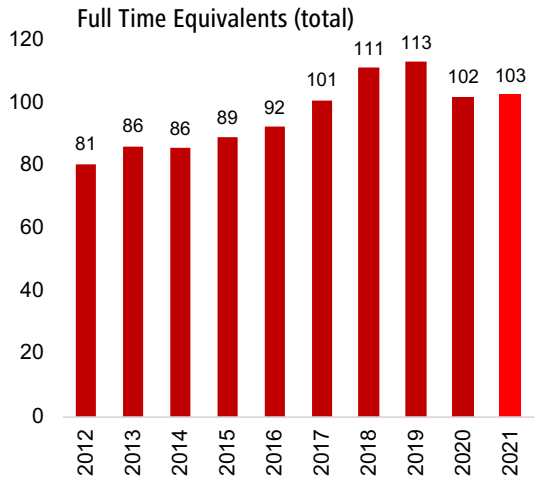
ZUSAMMENFASSUNG

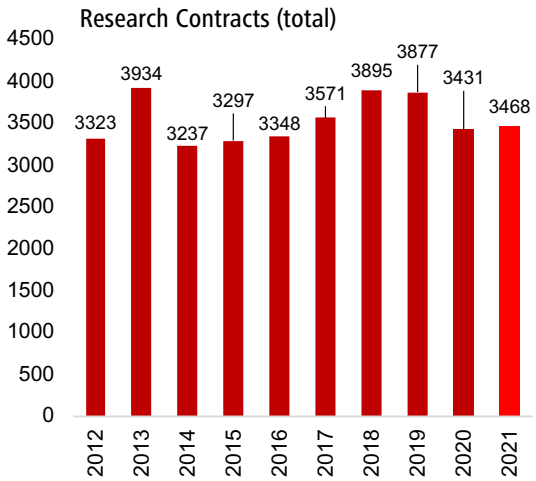
Der jährlich publizierte "swiTTreport" ist die umfassendste Analyse der Technologietransferaktivitäten öffentlicher Forschungsinstitutionen (PRO) in der Schweiz. Dieser Bericht umfasst zwei Hauptbereiche: Forschungsverträge mit privaten und öffentlichen Institutionen und die wirtschaftliche Verwertung von Forschungsergebnissen. Diese Aktivitäten werden häufig auch unter dem Begriff „Technologietransfer" zusammengefasst. Der Bericht zeigt, dass die schweizerischen PRO aktiv und erfolgreich mit der Wirtschaft interagieren.

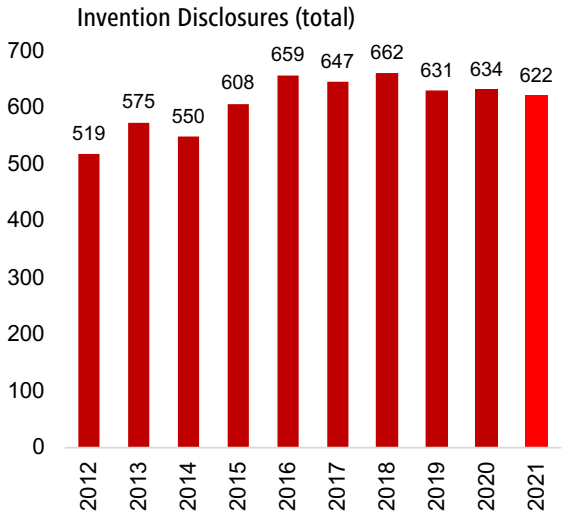
Der Bericht umfasst die Aktivitäten von sieben kantonalen Universitäten und beiden ETHs (zusammengefasst unter Universitäten), von drei Fachhochschulen (UAS) und von drei Forschungsinstitutionen des ETH-Bereichs (RI).

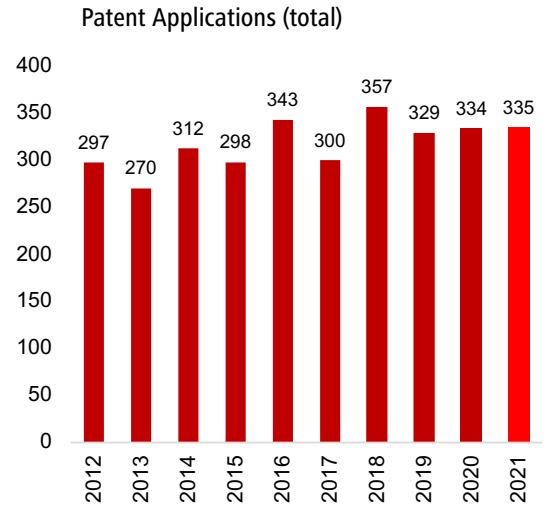
Insgesamt rapportierten die teilnehmenden Institutionen die folgenden Kennzahlen über ihre Technologietransferaktivitäten im Jahr 2021:

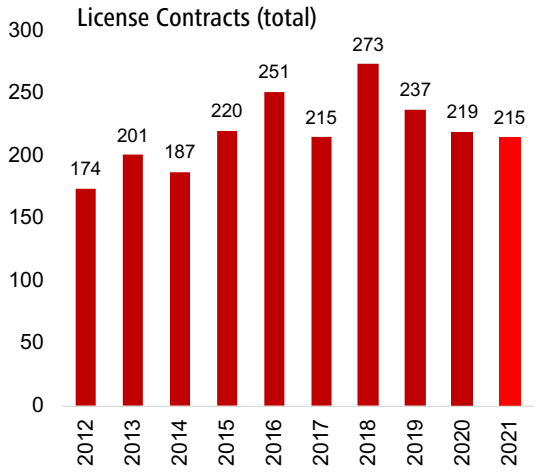
3468	Neue Forschungsprojekte
622	Erfindungsmeldungen
335	Patentanmeldungen
215	Lizenz- & Optionsvereinbarungen
83	Start-Ups gegründet

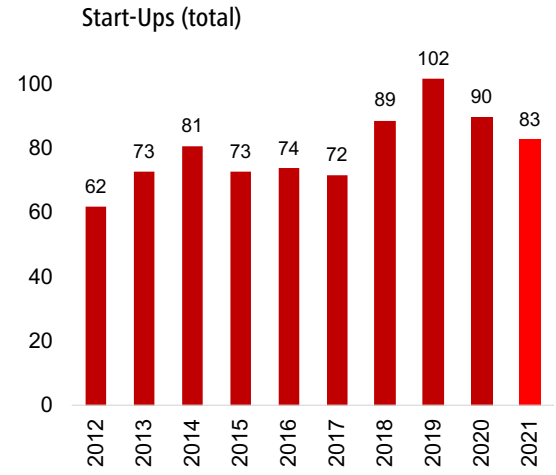












Overall data of the last ten years show a solid outcome of the TT activities in Switzerland.

CASE STUDY

Universität Basel

GeneGuide

PHOBYS – THE SCIENCE-BASED APP TO REDUCE FEAR OF SPIDERS

Problem – Challenge

Fear of spiders is widespread and can be very distressing. Although conventional exposure therapy has proven successful, sufferers rarely seek professional help because they are reluctant to expose themselves to real spiders. This calls for a new and innovative approach.

Solution

The smartphone-based app Phobys combines an evidence-based treatment approach with augmented reality technology.

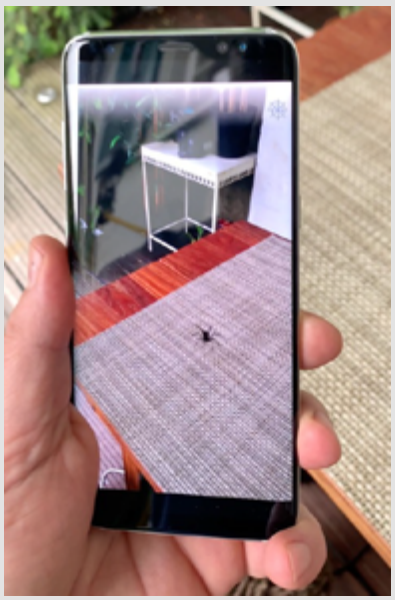
A spider is virtually added to the real world through the smartphone camera. Following the principles of exposure therapy, the user is confronted with increasingly difficult situations involving spiders over 10 levels. After mastering all levels, a memory of safety has been built up and helps the user to deal with their fear when confronted with real spiders.

Scientific evidence

We tested the effectiveness of the Phobys app in a randomized controlled trial at the University of Basel, Switzerland. Participants in the group who used Phobys at home for two weeks showed a significant reduction in fear and disgust of spiders afterwards – both in a real-life spider situation and in questionnaires (Zimmer et al., J Anxiety Disord, 2021). Phobys is now available for people with subclinical fear of spiders via a low-cost downloadable app.

Large potential

We are convinced that digital technologies such as virtual and augmented reality have great potential to enhance treatments in psychiatry by offering convenient, low-threshold and low-cost options. We are therefore committed to continue investing in the development of science-based applications.



1. PARTICIPATING INSTITUTIONS AND DATA COLLECTION

Two Swiss Federal Institutes of Technology (ETH) and eight cantonal universities (collectively "Universities"), seven universities of applied sciences (UAS), and three research institutes (RI) in the ETH domain were contacted in spring 2022 and asked to provide data on their technology transfer (TT) activities for the year 2021. The expression "technology transfer" used in this report covers the activities of these institutions with regard to research collaborations with partners from the economy and the commercialization of research results for the benefit of the economy and society overall.

The questionnaire was returned by nine members of Universities, all members of the RI as well as individual departments of three UAS. The data show that the handling of research collaborations with economic partners and other technology transfer activities varies substantially among different institutions. Of note: not all of them were able to provide a comprehensive overview and hence all aggregated data showed in this report represent the lower boundary of the actual situation. Appendix 1 shows the institutions that participated in the survey and comments on the comprehensiveness of the data provided.

The report mostly provides aggregate data for the three types of institutions covered in this survey (Appendix 2). For those institutions that agreed to disclose individual data some key figures are listed in Appendix 3.

Comments on data received by the different types of institutions:

Universities

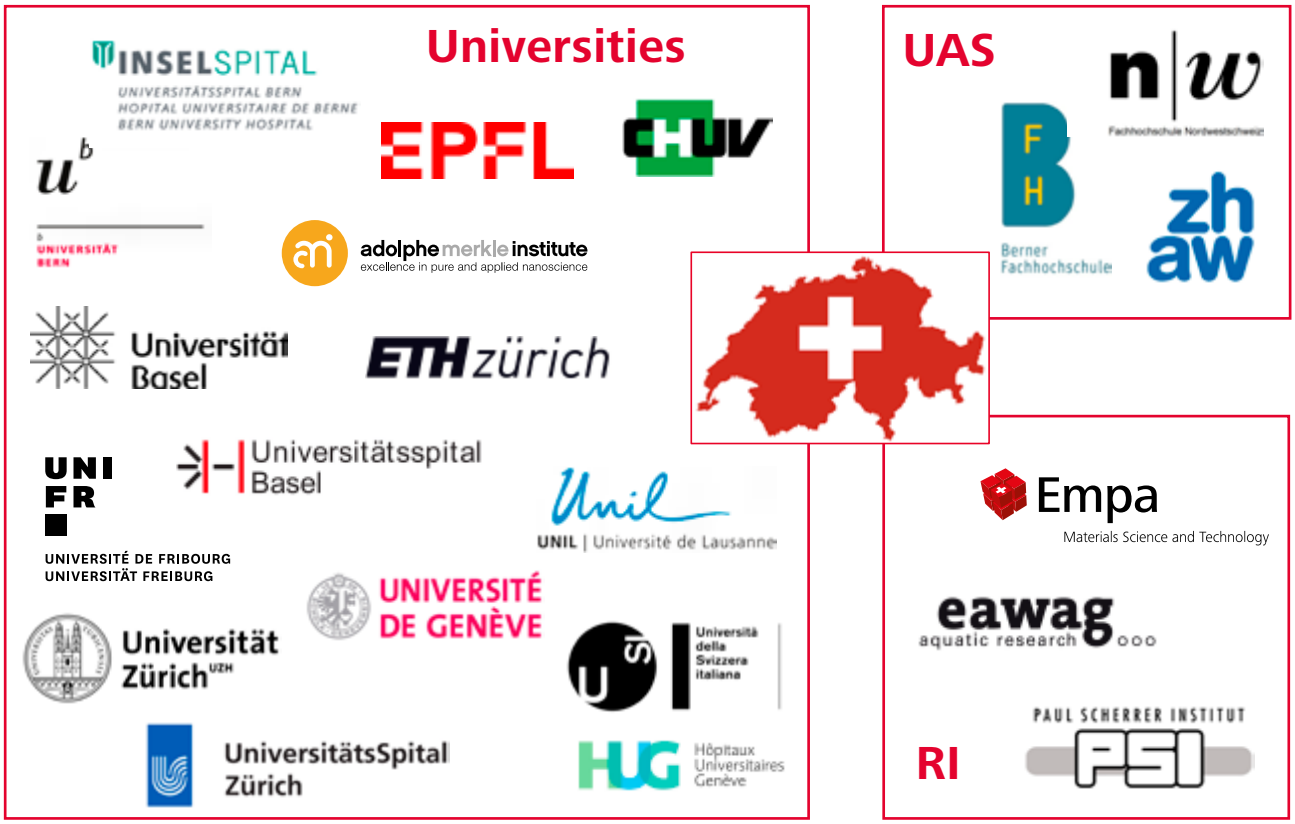
At several universities, only contracts for collaborative research projects with economic partners above a certain threshold need to be signed by university management. Therefore, not all collaborative projects can be reported by such institutions. Activities in research and technology transfer at university hospitals are usually closely linked to the respective university, hence the services of these TTOs are also available to researchers at the hospitals.

UAS

The management of technology transfer activities at the UAS varies widely among institutions and individual departments. Some departments or schools have professionals working in a centralized TTO and are able to provide comprehensive data. At other departments or schools, no centralized support functions exist and data are fragmentary or completely lacking.

RI

The research institutions that participated in the survey have centralized support functions providing technology transfer services for the researchers.



2. INSTITUTIONAL RESOURCES FOR TECHNOLOGY TRANSFER

2.1 Services Provided

All University TTO are handling contracts for research collaborations. However, at several Institutions the finalization of research agreements with the support of a centralised administrative department (e.g. TTO) is not mandatory, or not all contracts are covered (e.g. contracts for EU project or contracts <50 kCHF not included). All University TTO deal with the handling and commercialization of intellectual property (IP), which includes the evaluation of the commercialization potential of products or services based on research results, the protection and management of IP, and the licensing or sale of IP to industrial partners. Four of nine TTO at Universities also provided support for the coaching of start-up projects.

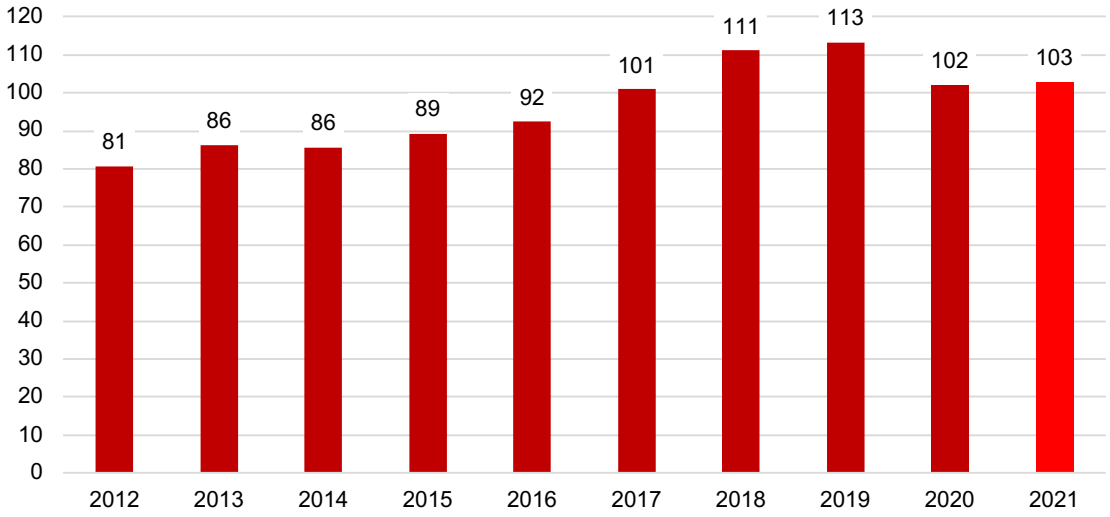
From the respondents two of three UAS TTO and all RI TTO offer support for research collaborations. All UAS TTO and all TTO of RI deal with the management of IP. The commercialization of IP is supported by all RI TTO and by all UAS TTO. Coaching of start-up projects is offered by two of three UAS TTO and one RI TTO.

2.2 Staffing

Staffing refers to the number of full-time equivalents (FTE) employed for TT activities at an institution. These are professionals such as licensing, intellectual property, technology or research contract managers and administrational staff, whose main occupation is in the area of technology transfer. Their activities cover the drafting and negotiating of research and cooperation agreements, intellectual property management, patent portfolio management, patent, technology licensing and other technology transfer activities. Part of the staff may also be involved in the supporting of start-up projects (Fig. 1).

TTO typically collaborate with external patent firms for the drafting, filing and prosecution of patent applications and may address specific legal issues to external attorneys. Several TTO outsource legal issues to external attorneys. At some institutions, start-up projects are handled by dedicated organizations such as business incubators.

Fig.1: Development of Staffing Level / Full Time Equivalents FTE



3. RESEARCH CONTRACTS WITH PARTNERS

3.1 Research Contracts Handled by the TTO

In 2021, the TTO handled a total of 3468 research contracts with economic and public partners. Research contracts handled by UNI decreased by 2 %, whereas research contracts handled by UAS increased by 5 % respectively handled by RI increased by 13 %. This number includes collaboration agreements, clinical trial agreements, Innosuisse IPR and EU collaboration agreements. SNSF projects (with funding provisions) are only included in these numbers if they involve multiple partners and therefore a collaboration agreement (Fig. 2).

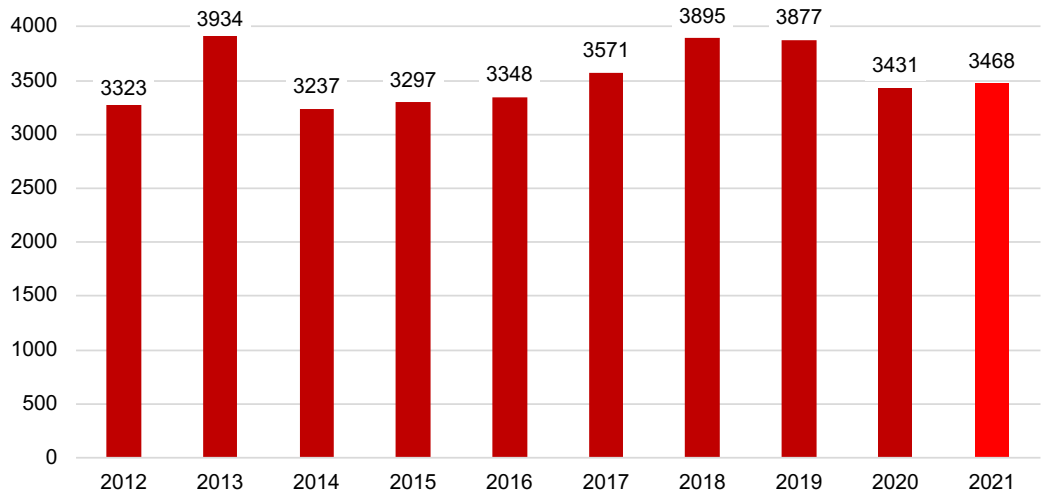
Research collaborations between academia and industry are a key aspect of TT, they do indeed bring benefits to academia and the economy. They not only allow industry to access the know-how and infrastructure of academia, companies also

gain access to academic talents through such collaborations. Likewise, academic labs can also benefit from the know-how and infrastructure of the industrial partners. The funding of joint projects by partners from the economy may account for a significant part to the research budgets of certain PRO.

Such collaborations are a great opportunity to feed and enrich each other in cutting edge innovation areas.

In addition to research collaborations, TTO handle other types of agreements which foster the cooperation between academia and economic partners, such as consulting agreements, material transfer agreements (MTA), and non-disclosure agreements (NDA). In 2021, the institutions reported altogether 3211 such other types of TT agreements.

Fig. 2: Number of Research Agreements and EU Contracts Handled by TTO

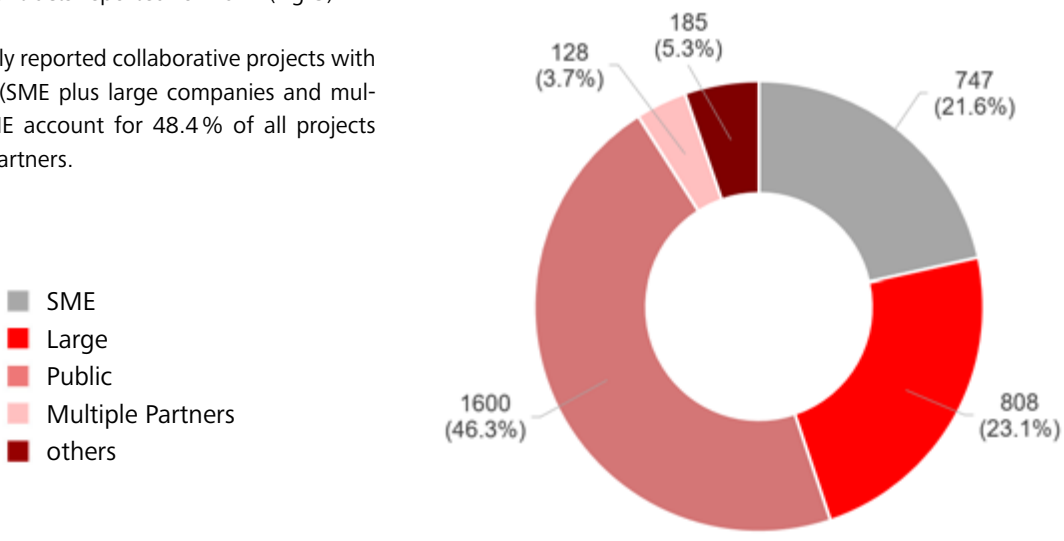


3.2 Type of Collaboration Partners

With regard to the type of collaboration partner, the small- and medium-sized enterprises (SME), i.e. companies with fewer than 250 employees, account for 21.6 % of total research contracts reported for 2021 (Fig. 3).

If one considers only reported collaborative projects with the private sector (SME plus large companies and multiple partners), SME account for 48.4 % of all projects with commercial partners.

Fig.3: Type of Collaboration Partner



CASE STUDY

Institute for Research in Biomedicine

HUMABS BioMed
a subsidiary of Vir Biotechnology

HUMABS BIOMED – XEVUDY: SARS-COV-2 MONOCLONAL ANTIBODIES

Problem – Challenge

Severe acute respiratory syndrome Coronavirus-2 ("SARS-CoV-2") is a new strain of coronavirus not previously identified in humans, which led to the coronavirus outbreak of 2019. Whereas "COVID-19" is the disease associated with this virus. The spike protein located on the outside of a coronavirus is how SARS-CoV-2 enters human cells. The virus uses the spike protein to perform a viral entry into the host cell, a required early step in viral replication. However, its location on the outside of the virus also makes it an effective target for the immune system. Therefore, several biotech companies tried to develop monoclonal antibodies as treatments for COVID-19, but only very few have shown to be successful.

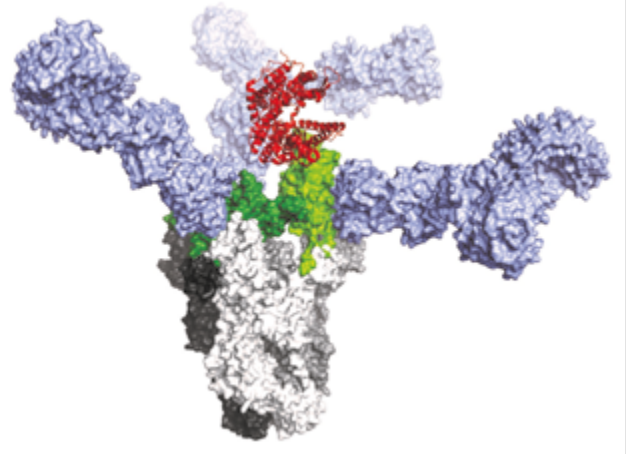
Solution

Humabs BioMed originally a Spin-off of the Institute for Research in Biomedicine (IRB – affiliated to the Università della Svizzera italiana), in Bellinzona, has later been acquired by Vir Biotechnology. Founded in 2004, Humabs operates in the field of immunology by identifying and producing monoclonal antibodies from human blood (mAbs) also thanks to a patent protected technology invented by Prof. Antonio Lanzavecchia at the IRB and exclusively licensed to Humabs. These antibodies are isolated and processed to attack and neutralize viruses, bacteria or molecules that are the source of infectious diseases.

With the COVID-19 outbreak Humabs was able to identify antibodies effective against both SARS-CoV-1 and SARS-CoV-2. The company isolated antibodies targeting highly conserved sequences and therefore more likely to remain effective against future variants of SARS-CoV-2. After a series of trials, Humabs scientists eventually settled on a single candidate antibody, and by collaborating with GlaxoSmithKline (GSK) developed the monoclonal antibody Sotrovimab.

Sotrovimab, sold under the brand name Xevudy, is a human neutralizing monoclonal antibody with activity against SARS-CoV-2. When Sotrovimab binds to the spike protein, the virus is unable to enter the body's cells. This antibody effectively stops the virus from replicating and prevents a potential hospitalization for the patient.

Sotrovimab is now approved in the European Union and in several other countries for the treatment of adults and adolescents with COVID-19 and it has been administered to patients worldwide.



Sotrovimab on Spike
purple: full IgG1 model of Sotrovimab
red: ACE2
grey: SARS-CoV-2 spike monomers of the trimer
dark green: closed RBD (Receptor-Binding Domain)
light green: open RBD

CASE STUDY

NEMATX – HIGH-PERFORMANCE POLYMER 3D PRINTING

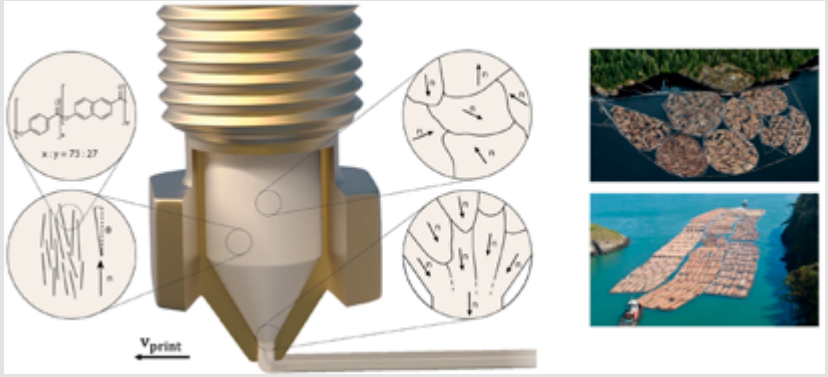
Problem – Challenge

Innovative industrial companies often require technical products in comparably small quantities, where mass manufacturing is not a viable solution because of high initial costs and long lead times. But due to a lack of alternatives, companies are forced to use existing manufacturing solutions and to outsource their production to countries with low labor costs, followed by shipping of their products around the globe. A potential solution that has emerged over the past years is additive manufacturing, commonly referred to as 3D printing. But especially for polymer or plastic products, the quality of 3D printed parts is not yet good enough for the most demanding industrial applications

Solution

NematX has set out to make industrial manufacturing more agile, competitive and sustainable. For this purpose, the ETH Spin-off has developed an industrial 3D printing platform with which they introduce a new and fully recyclable material class termed liquid crystal polymers (LCP). In combination with their in-house developed high-precision 3D printers based on the fused filament fabrication (FFF/FDM) technique, NematX can accurately control the material microstructure during printing and produce parts with a currently unmatched combination of manufacturing precision and part performance in polymer 3D printing. Besides excellent mechanical, thermal and chemical product properties, customers benefit from up to 20 times faster print speeds compared to the current state-of-the-art. The young startup's ambition is to help solve technical and societal challenges from deep sea to the outer space and they do this by pushing the current limits of industrial 3D printing with new and sustainable materials, swiss-precision hardware and a manufacturing solution that is competitive and at the same time resource-efficient.

Product samples from ETH Spin-off NematX. Their 3D printed LCP parts are designed to perform in the harshest industrial environments.



With their proprietary "Nematic 3D Printing" technology, NematX can accurately control the material microstructure of liquid crystal polymers (LCP) during the extrusion process.

4. COMMERCIALIZATION ACTIVITIES

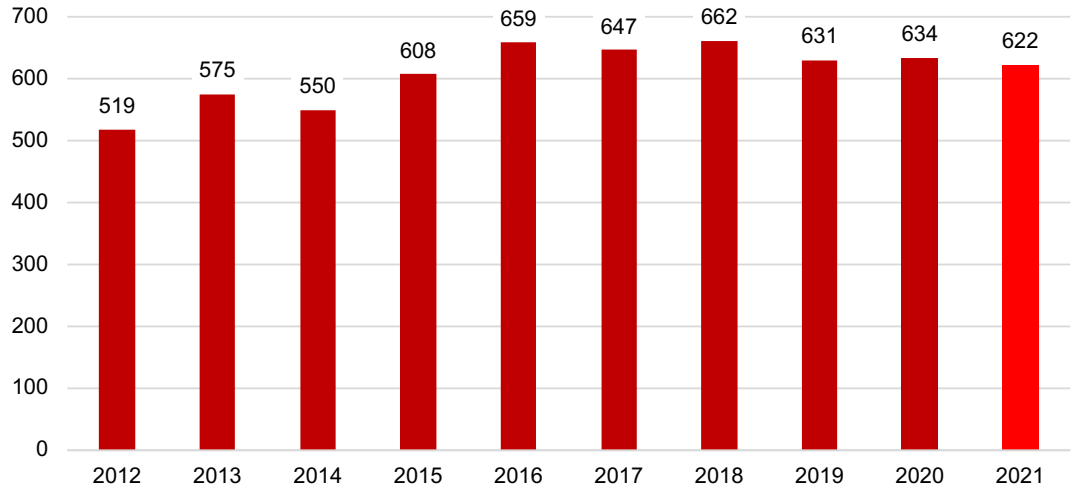
Research results of Universities, UAS and RI do have potential to form the basis for innovative products and services which are developed and later commercialized by companies. The public institutions strive to make research results with a potential for socio-economic impact available to the private sector. Usually this is done through licensing of technologies to companies. To raise the attractiveness of academic TT and licensing for industry, research results with socio-economic potential need to be screened and identified, and the corresponding intellectual property rights need to be secured. While software is protected by copyright, protection of most new technologies is sought in form of patent applications. Without an appropriate protection of the intellectual property, industrial or financial investors in many industry sectors will not consider investing for the research and development of products that are then free to be copied by competitors. With regard to patentable inventions, this process involves the following main steps: identification and evaluation of research results through invention disclosures, filing of patent applications, identification of suitable licensing partners, negotiating and concluding license agreements with existing companies or newly created start-up companies. Within many institutions, the creation of such start-up companies is supported by various additional services.

Sections 4.1 – 4.4. of this report describe the key TT indicators on commercialization activities from the participating institutions, section 4.4 is in particular related to start-ups.

4.1 Invention Disclosures

A total number of 622 invention disclosures were reported for 2021, a slightly decreased number compared to the previous year (Fig. 4).

Fig.4: Number of Invention Disclosures



4.2 Patenting Activities

4.2.1 Priority Patent Applications

The protection of intellectual property in the form of patents is of great importance in many industry sectors. This is particularly true for industries with high product development costs and long product lifecycles, e.g. biotechnology and pharmaceuticals. The TTO at PRO must decide at an early stage about filing patent applications because patenting of an invention is no longer possible after the results have been rendered public in scientific journals or through other channels.

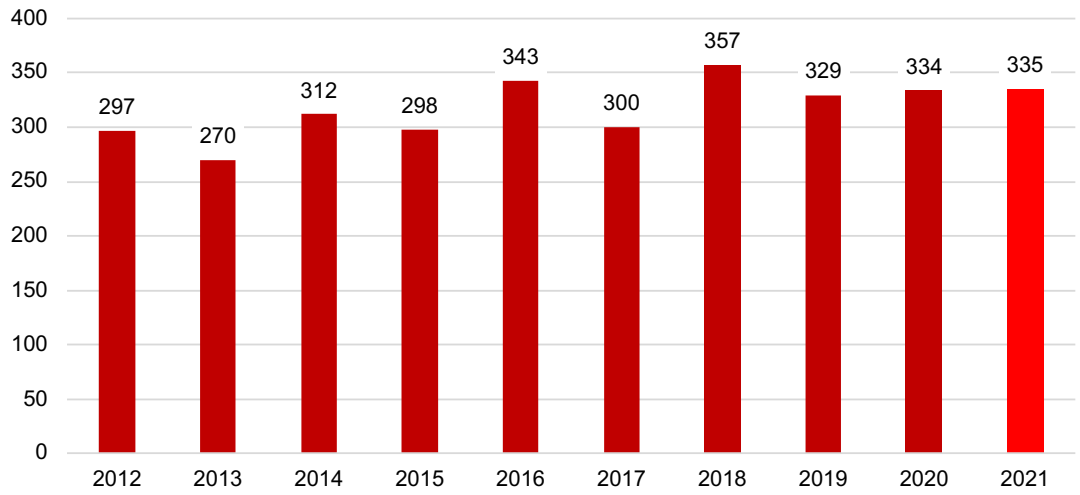
Moreover, many companies will not consider evaluating a new technology if it is not protected by a patent. Thus, patenting activities of PRO can be a prerequisite for entering into a partnership with an industrial partner. The reported number of 335 priority applications filed in 2021 is almost exactly on the same level as in previous years (Fig. 5).

4.2.2 Patent Portfolio – Active Patent Cases End of 2021

At the End of 2021, the institutions participating in the survey reported 2983 (+6.6%) active patent cases which were either licensed to a company or for which they were searching for a licensee.

Marketing of such technology opportunities is done by the PRO through various channels. Identifying the responsible person within the organization of a potential licensee is a challenge, and often existing contacts of researchers are used to approach companies. To support the research institutions in their technology marketing efforts, swiTT runs the searchable national technology portal swiTTlist (www.switt.ch/swittlist) providing industry with a quick and easy, up-to-date overview of current technology opportunities from Swiss PRO. TTO regularly upload new technologies on this searchable portal. With the help of an automatic alert system, company representatives are informed immediately each time a new technology is available in their field of interest.

Fig. 5: Number of Priority Patent Applications Filed



4.3 Licensing

4.3.1 Licenses and Sales of Intellectual Property (IP)

In 2021, overall 215 (-1.8%) new IP agreements, usually licenses, were reported, in a few cases the agreements involved a sale of the IP rather than a license (Fig. 6). In total 80.5% of all agreements were handled by Universities.

4.3.2 Type of Licensing Partners

PRO regularly license technologies to their start-up companies, that are included in the SME share (Fig. 3). Thus, start-up companies play an important role in developing university technologies. Depending on the industry segment and on the particular product these companies will either market the final products themselves or will sublicense the technologies to larger companies that have the necessary know-how and resources to bring the product successfully on to the market.

Frequently, projects or start-ups are acquired by larger companies once their products or services have reached sufficient maturity.

4.3.3 License Portfolio and License Income

The number of active licenses under management at the end of 2021 was reported as 1367 (-6.8%) cases.

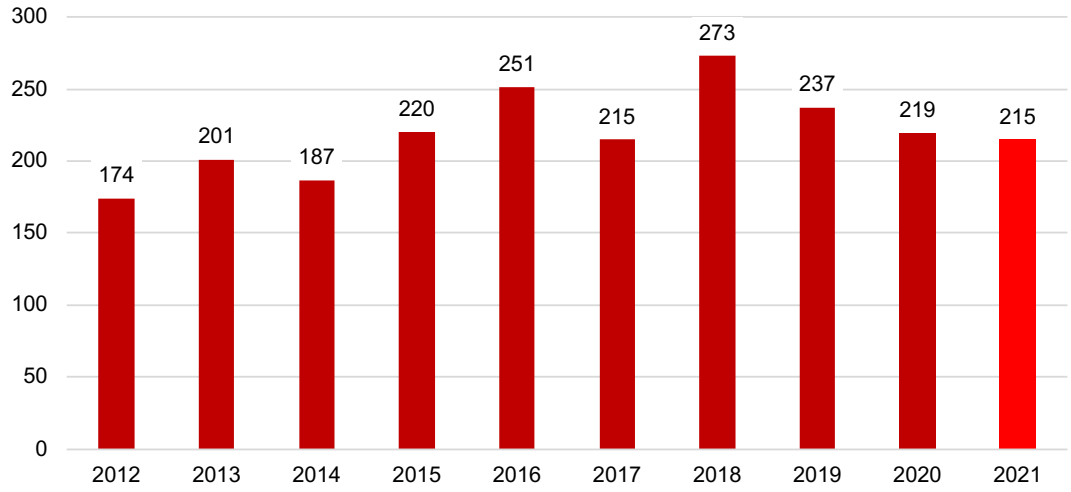
Of these active licenses 44.3%, namely 606 cases resulted in license income to the institutions and the researchers involved This figure has increased continuously in the past years in line with the growing number of products sold on the market that are based on research results of PRO. In the other cases income resulted from other type of license fees, e.g. license issue fees or milestone payments for products still in the development process.

These figures reflect the typical situation of licenses granted to industry by PRO. Many of the licensed technologies are at an early stage and require extensive development by the licensee. It often takes several years until a product reaches the market. The development risk is often high for these early stage technologies, and a significant number of projects are stopped before a marketable product is ready.

When licensing to start-up companies, some institutions may accept equity in such companies as a partial compensation for the licensing of technology. Such equity transactions usually replace down-payments or early milestone payments in order to avoid any cash drain from the start-up at the early stage of development. This results in a deferral of license revenues from such licenses until the shares in such start-up companies are sold by the institutions.

In the past years more institutions started to accept equity as part of their license deals, thus reducing the annual licensing income and adding the management of an equity portfolio to their services.

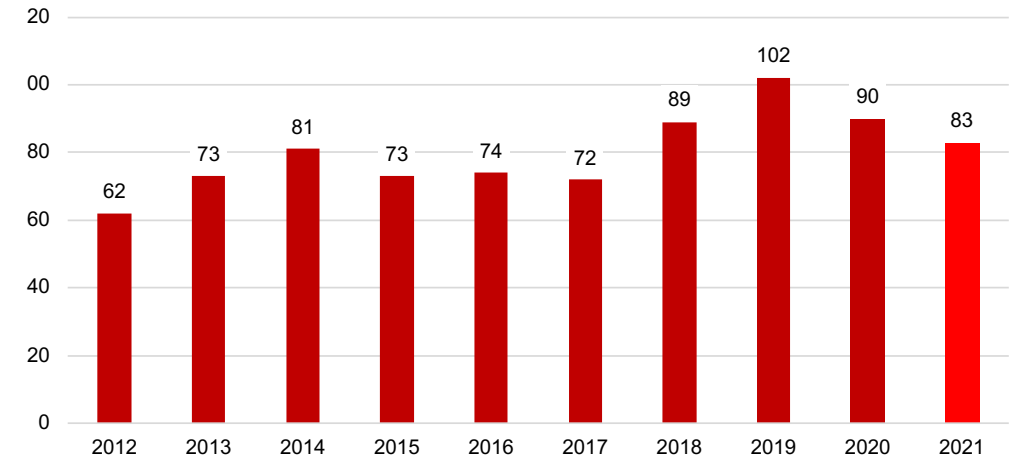
Fig. 6: Number of new License, Option or Sales Agreements for Intellectual Property Rights (IPR)



4.4 Start-up Companies

In 2021 the TTO reported a total of 83 (77 by UNI, 3 by UAS and 3 by RI) new start-up companies (-7.8 %), whereby 35 of these companies (42.2%) relied on a license or a contractual transfer of intellectual property from a PRO (Fig. 7). The remaining companies were created on the basis of know-how developed at the research institutions without a formal license.

Fig. 7: Number of Start-up Companies Founded



CASE STUDY

Universität Zürich[UZH]

condenZero

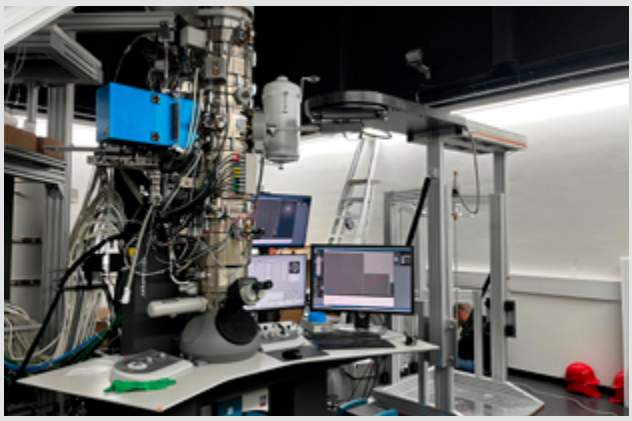
OPENING NEW FRONTIERS IN CRYO-ELECTRON MICROSCOPY

Problem – Challenge

Cryo-electron microscopy (EM) is an extremely powerful experimental technique to study the atomic structure of biological systems, materials and nano-structures and has led to fundamental breakthroughs in the life- and material sciences, culminating in the chemistry Nobel prize 2017. State-of-the-art equipment for cryo-EM users that require even lower temperatures close to the absolute zero point (-273°C), can stabilize the thermal conditions only for very limited time (~15 min). Because of this short time window, effective research is greatly inhibited as experiments are terminated prematurely. Moreover, cool-down cycles per sample are very lengthy (~2 hrs) during which the microscope is blocked and unused, adding up unnecessary costs (~400 $/hrs) over time. With a recent patented invention, we have the technology to overcome all these limitations and revolutionize the market for cryo-microscopy.

Solution

Our new cryo-invention provides us with the technology to manufacture a cryo-sample holder that solves all existing limitations. We have developed a novel cryogenic cooling principle that enables rapid cool-down cycles (~10 min) and maintains the cryogenic state for over 24 hrs. This new solution is enabled by additive manufacturing technology and advances in material science. The longer experimental time window that our solution provides paves the way for new and effective research possibilities in the life- and physical sciences. With our cryo-holder of electron microscopes entirely new experiments and fields open up to our customers.



CASE STUDY

LAUNDRECYCLE – WATER- AND ENERGY SELF-SUFFICIENT LAUNDRETTE

Problem – Challenge

While the City of Cape Town, South Africa, already experienced a severe water crisis in 2018, other regions across the country are increasingly at risk of facing the same fate. At the same time, thousands of residents of informal and rural settlements have limited or no access to save water and are exposed to the negative consequences of the lack of wastewater infrastructure. In addition, the country suffers from so called load shedding, which are planned power black outs for several hours to reduce energy demand. The development of new solutions and the use of alternative water and energy sources are therefore urgently needed.

Solution

The aim of the laundromat "LaundReCycle" is to run completely off-grid and therefore save water and energy, while providing laundry services to the customers as well as new economic opportunities for the operators. The technology is based on a natural and resource efficient water treatment process, using biological treatment methods. The treated water is reused in a closed cycle, while water losses are filled up with rainwater from the roof. The system is powered by off-grid solar power with battery storage. The technology was first developed by the researchers at ZHAW in Switzerland. After a technology transfer workshop in 2019, the South African partners built the LaundReCycle pilot facility in Cape Town in January 2021. Since then, the local partners operate the laundromat and provide valuable insights for the research activities led by ZHAW. The aim of the project is to develop a marketable solution that can be implemented across the country. In this context, the researchers are also looking into the integration of other greywater sources, such as greywater from the shower and using the treated water not only for the laundry but also for other purposes such as irrigation.

APPENDIX 1 – INSTITUTIONS WITH TECHNOLOGY TRANSFER ACTIVITIES CONTACTED FOR THE SURVEY AND COMMENTS ON THEIR DATA PROVIDED

Universities	TT-Office	Comments on data provided
Ecole Polytechnique Fédéral (EPF) Lausanne	TTO	Complete data, research contracts <50 kCHF only partly
Eidgenössische Technische Hochschule (ETH) Zürich	ETH transfer	Complete data, research contracts <50 kCHF only partly
Universität Basel / Universitätsspital Basel	Unitectra	Only aggregated data, data only for the Medical, Natural Sciences and Psychology Faculties, partial data for hospital
Universität Bern / Inselspital	Unitectra	Only aggregated data, data only for the Medical, Vetsuisse and Natural Science Faculties, no data for research agreements of other faculties
University of Fribourg, including Adolphe Merkle Institute	Tech Transfer Fribourg	Partial data, not all contracts pass through TTO, especially SNSF or EU-grants are treated separately
Université de Genève / Hôpitaux universitaires de Genève	Unitec	Complete data for commercialization activities, research contracts
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	Complete data for commercialization activities, research contract
Université de Neuchâtel	TTO	No data
Università della Svizzera italiana (USI) / Institute for Research in Biomedicine (IRB) / Institute for Oncology Research (IOR)	SRIT	Complete data
Universität Zürich / Universitätsspital	Unitectra	Only aggregated data, data only for the Medical, Vetsuisse and Natural Science Faculties, no data for research agreements of other faculties

Universities of Applied Sciences	TT-Office	Comments on data provided
Berner Fachhochschule (BFH)	TTO	Partial data from several departments (AHB,TI,WGS,HKB,HAFL)
Fachhochschule Nordwestschweiz (FHNW)	TTO	Data available from School of Life Sciences (HLS)
Ostschweizer Fachhochschulen (OST)	TTO	No data due to reorganization
Zürcher Hochschule für Angewandte Wissenschaften (ZHAW)	Ressort F&E	Only data on survey questions 1 to 3.
Lucerne University of Applied Sciences and Arts (HSLU)	Ressort F&E	No data
Haute Ecole Spécialisée de Suisse occidentale (HES-SO)	HES-SO	No data due to reorganization of data acquisition
Scuola Universitaria Professonale della Svizzera Italiana (SUPSI)	Fond. AGIRE	No data

Research Institutes	TT-Office	Comments on data provided
Swiss Federal Institute for Materials Science and Technology (Empa)	Empa-Eawag TT-Office	Complete data
Swiss Federal Institute of Aquatic Science and Technology (Eawag)	Empa-Eawag TT-Office	Complete data
Paul Scherrer Institut (PSI)	PSI TT-Office	Complete data

Following universities with main scope in humanities were not contacted:
University of Lucerne, University of St. Gallen, FHS St. Gallen – University of Applied Sciences

APPENDIX 2 – DETAILED DATA 2012 – 2021

All Public Research Organisations	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Full-time equivalents (FTE)	81	86	85.7	89.2	92.4	100.9	111.2	113.2	101.6	102.7
Research contracts (incl. EU contracts)	2349	3924	3237	3297	3348	3571	3895	3877	3431	3469
Invention disclosures	519	575	550	608	659	647	662	631	634	622
Priority patent applications	297	270	312	298	343	300	357	329	334	335
Active patent cases end of the year	1818	1951	1969	2191	2429	2519	2611	2744	2798	2983
License agreements	174	201	187	220	251	215	273	237	219	215
Active license agreements end of the year	1307	1351	1437	1474	1591	1413	1558	1663	1467	1367
License agreements with revenues in resp. year	308	386	376	406	463	451	389	415	443	606
New start-ups	62(29)	73(45)	81(49)	73(47)	74(53)	72(52)	89(44)	102(63)	90(55)	83(34)

Universities	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Full-time equivalents (FTE)	50	52.3	56.1	55.5	59.2	70.2	70.3	73.7	74.5	77.1
Research contracts (incl. EU contracts)	2348	2360	2195	2303	2465	2435	2574	2508	2603	2548
Invention disclosures	444	458	508	565	606	593	592	568	589	579
Priority patent applications	257	244	281	262	320	271	314	293	301	307
Active patent cases end of the year	1664	1779	1839	2008	2202	2318	2376	2492	2560	2743
License agreements	146	167	168	192	229	198	228	206	189	173
Active license agreements end of the year	1167	1213	1320	1352	1487	1313	1438	1543	1393	1306
License agreements with revenues in resp. year	270	337	339	203	410	429	357	373	414	584
New start-ups	43(23)	49(35)	61(38)	58(41)	64(44)	61(44)	71 (38)	78(54)	80(49)	77(32)

UAS	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Full-time equivalents (FTE)	23	26.1	22.2	24.9	24	21.6	30.0	28.4	16.2	14.6
Research contracts (incl. EU contracts)	621	1254	677	574	442	727	871	944	353	372
Invention disclosures	35	80	10	9	9	10	36	27	7	4
Priority patent applications	8	2	1	3	1	2	17	12	7	2
Active patent cases end of the year	42	39	9	9	41	14	44	48	22	23
License agreements	17	19	3	3	4	2	23	10	6	8
Active license agreements end of the year	17	19	2	2	18	1	17	16	5	1
License agreements with revenues in resp. year	17	18	3	3	1	1	9	15	1	1
New start-ups	14(5)	19(8)	18(10)	9(6)	5(2)	2(1)	16(4)	20(5)	4(2)	3(2)

RI	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Full-time equivalents (FTE)	8	7.7	7.4	8.8	9.2	9.1	10.9	11.2	11	11
Research contracts (incl. EU contracts)	353	320	365	420	441	409	450	425	475	548
Invention disclosures	40	37	32	34	44	44	34	36	38	39
Priority patent applications	32	24	30	33	22	27	26	24	26	26
Active patent cases end of the year	112	133	121	174	186	187	191	204	216	217
License agreements	11	15	16	25	18	15	22	21	24	34
Active license agreements end of the year	123	119	115	120	110	99	103	104	69	60
License agreements with revenues in resp. year	21	31	34	43	51	21	23	27	28	21
New start-ups	5(1)	5(2)	2(1)	6(0)	5(2)	9(7)	2(2)	4(4)	6(4)	3(0)

Note (i): For new start-ups the numbers in parentheses refer to start-ups on basis of a formal license
Note (ii): The number of the institutions that participated in the survey varies between years

APPENDIX 3 – KEY PARAMETERS FOR INDIVIDUAL INSTITUTIONS FOR 2021

Institution	Name TTO	Start TTO	# of TTO FTE	# research contracts	# of invention disclosures	# of priority applications	# of IP agree-ments	# of start-ups
Universities								
Ecole Polytechnique Fédéral (EPF) Lausanne	EPFL-TTO	1993	15.0	233	134	76	40	32
Eidgenössische Technische Hochschule (ETH) Zürich	ETH transfer	1995	27.1	732	193	99	27	25
Universität Basel / Universitätsspital Basel Universität Bern / Inselspital Universität Zürich / Universitätsspital Zürich	Unitectra	1999	12.8	1224	153	93	77	13
Université de Genève / Hôpitaux universitaires de Genève	Unitec	1998	10.2	93	58	18	21	4
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	2000	9.6	194	25	11	7	2
Università della Svizzera italiana (USI) / Institute for Research in Biomedicine (IRB) / Institute for Oncology Research (IOR)	SRIT	2018	1.0	40	13	8	0	0
UAS								
Berner Fachhochschule (BFH)	TTO	1999	12.8	316	3	2	7	3
RI								
Swiss Federal Institute for Materials Science and Technology (Empa)	Empa-Eawag TT-Office	2005	4.0	232	22	13	14	3
Swiss Federal Institute of Aquatic Science and Technology (Eawag)	Empa-Eawag TT-Office	2001	1.7	113	1	1	6	0
Paul Scherrer Institut (PSI)	PSI TT-Office	1999	5.3	203	16	12	14	0

Note: The table lists individual data only of those institutions that agreed to publish it.

GLOSSARY

EPF	Ecoles Polytechniques Fédérales
ETH	Swiss Federal Institutes of Technology
EU	European Union
FTE	Full Time Equivalent (for the number of employees)
IP	Intellectual Property
MTA	Material Transfer Agreement
NDA	Non-Disclosure Agreement
PRO	Public Research Organisation
RI	Swiss Federal Research Institutions in the ETH domain
SME	Small- and Medium-sized Enterprises (<250 employees)
SNSF	Swiss National Science Foundation
Start-up	Newly established company founded or co-founded by researchers from the respective institution and which either relies on a formal license of IP or on know-how developed at the institution
swiTT	Swiss Technology Transfer Association
TT	Technology Transfer
TTO	Technology Transfer Office(s)
UAS	Universities of Applied Sciences
Universities	Cantonal Universities and Swiss Federal Institutes of Technology

CASE STUDY

INTELLIGENT SOFTWARE PLATFORM FOR OPTIMAL POWER GRID MANAGEMENT

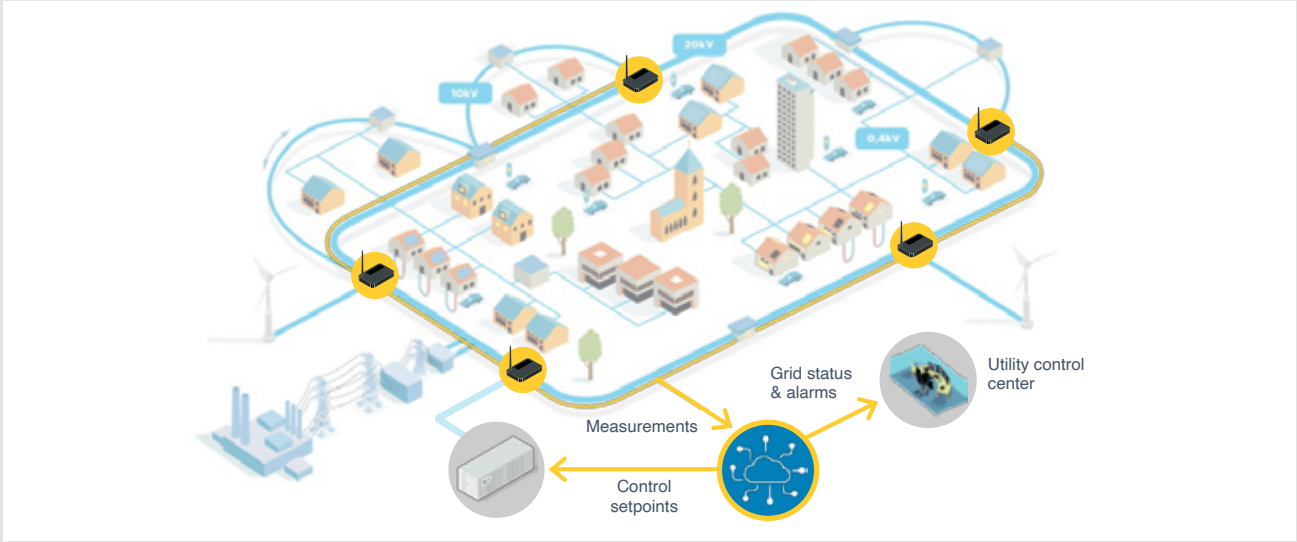
Problem – Challenge

The continuous integration of renewable energies, battery storage systems and electric mobility in the existing grid infrastructure is creating non-negligible challenges to power utilities that are still managing their grids with limited situational awareness.

In particular the demand for increasing grid observability, flexibility and resiliency requires the introduction of active network management schemes that are able to instantaneously balance the demand and the supply, while guaranteeing the highest power quality standards.

Solution

To help grid operators optimally manage their grid infrastructure, Zaphiro Technologies SA, founded in 2017, has developed a software platform relying on patented algorithms originally developed at the Distributed Electrical Systems Laboratory (DESL) of Professor Mario Paolone at EPFL. Such a solution leverages high-speed and time-synchronized measurements provided by so-called Phasor Measurement Units (PMUs) to extract unique insights on the status of the power grid. The system seamlessly integrates with existing control room solutions of the utility where the operators can visualize grid state and alarms in real-time to detect and locate faults.



CASE STUDY

SELECTIVE ENDOCANNABINOID REUPTAKE INHIBITORS (SERIS) IN CNS DISORDERS

Problem – Challenge

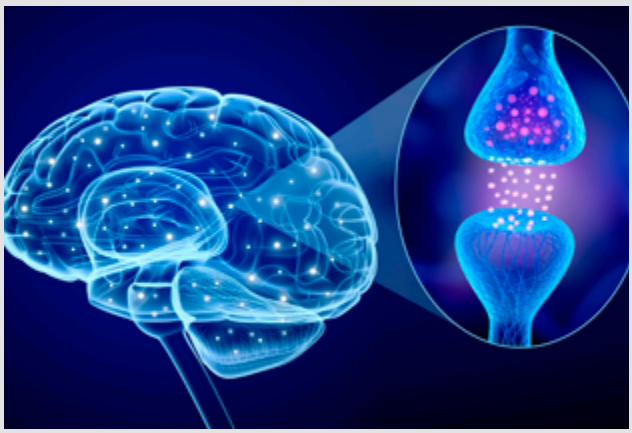
SERIs are competitive and reversible first-in-class inhibitors that restore the normal functioning of the brain by increasing the levels of endogenous cannabinoids (endocannabinoids). They represent a new potential therapeutic approach for central nervous system (CNS) disorders, in particular anxiety, mood and stress-related conditions such as post-traumatic stress disorder (PTSD). This is an area of medicine that has been greatly underserved by new therapies over the past 25 years.

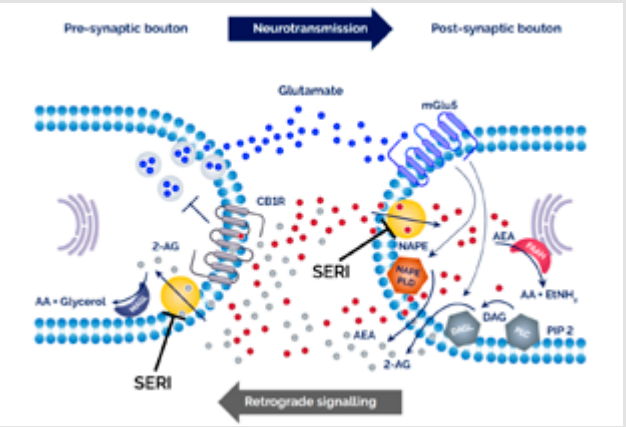
Solution

Prof. Jürg Gertsch and Dr. Andrea Chicca from the IBMM at the University of Bern have discovered this novel mode of action and identified this new class of SERIs. They co-founded Synendos Therapeutics AG, together with Dr. Simon Russell, an experienced biotech executive, as a biopharmaceutical company with the aim of bringing the SERIs into the clinic. The innovation that underpins Synendos has been recognised with around 4 Mio CHF in grant funding and a 24 Mio CHF Series A financing round in 2020/21.

Synendos has arisen from many years of solid basic research on endocannabinoid biology and pharmacology and a thorough medicinal chemistry programme that led to identification of the lead preclinical drug candidate SYT-510. Development work is accelerating and Synendos anticipates entering clinical development with SYT-510 in 2023.

Application area: Pharma
Partners: Synendos Therapeutics AG, Spin-off University of Bern





APPENDIX 4 – THE QUESTIONNAIRE

swiTT Technology Transfer Survey 2021 (online survey)

Preliminary Notes:

- ► All questions refer to the previous calendar year. Please make your statements accordingly.
- ► If no answer is available for certain questions, please indicate with "-1". Questions for which your office or your institution does not collect data should be as well indicated with "-1" and should not be answered by giving an estimate.

1. Confidentiality

Do you agree to the publication of your individual data collected in the questions marked [pub] under your institution name? ☐ Yes ☐ No

Note: In case you tick "Yes", your input for the questions marked [pub] will be published both in aggregated format as well as related to your institution (in the Appendix 3). In case you tick "No", your input for the questions marked [pub] will be published in aggregated format only.

2. Background Information

2.1 Name of the academic institution

2.2 Is your institution associated with a university hospital? ☐ Yes ☐ No
Note: If "Yes", all figures given below should include the numbers of the hospital(s).

2.3 Does your institution have a dedicated office (TTO) / responsible person for TT activities? ☐ Yes ☐ No

If "Yes", in which year did the TT program start? [pub]

2.4 Name of the responsible contact person for the survey

2.5 Contact information of the TTO (or the responsible person for TT activities)

Name Institution:
Name TTO:
Street:
Postal Code:
City:
Telephone (1):
Telephone (2):
E-Mail:

3. Activities and Human Ressources

3.1 What are the activities of your TTO?

(A) Research contracts (drafting, negotiating, controlling) ☐ Yes ☐ No
(B) Evaluation, protection and management of IP ☐ Yes ☐ No
(C) Commercialisation of IP (licensing, marketing) ☐ Yes ☐ No
(D) Support and/or Coaching of start-up projects ☐ Yes ☐ No
(E) Financial administration of research projects ☐ Yes ☐ No

3.2 Full time equivalents FTE employed in your TTO on Dec. 31st of last year [pub] FTE

Note: Please consider staff with main occupations (> 20%) in the area of technology transfer, such as 'Licensing Officers', 'Intellectual Property Managers', 'Technology Managers', or 'Research Contract Officers'. Please do not include project managers carrying out transfer projects.

3.3 Of these FTE, how many were employed to work on

(A) Technology transfer activities FTE
(B) Administration and general management FTE

Comment 3.1 - 3.3
(e.g.if additional people outside your TTO but inside your institution are also working in technology transfer activities according to 3.1, special organisation with specific faculties, centralized/decentralized organisations)

4. Research and Development

4.1 Total number of new research contracts handled by your TTO [pub]
Note: The number should include collaboration agreements, service agreements, clinical trial agreements, Innosuisse complementary and EU agreements. The number should not include MTAs, NDAs, other TT contracts (see 4.3) and SNSF contracts.

Of these research contracts, how many were executed with small and medium enterprises (SME), how many with large companies and how many with public partners?
Note: Companies with 250 or less employees should be considered as SME.

SME:
Large Company:
Public Institution:
Multiple Partners:
Don't know:

4.2 Amount of cash payments due to your institution from research contracts that were handled by your TTO according to 4.1 CHF

Note: Please give the amount of cash due to your institution, without any material assets e.g. for machinery. Please consider not the total amount of research projects, e.g. if an EU project adds up to 3 Mio. EUR but your institution gets only 200'000 thereof, the latter shall be given. Please do not split the amount if the contract is covering several years but report the full amount in the year the contract is signed.

4.3 Number of other technology transfer contracts handled by your TTO

Note: Please consider non-disclosure agreements (NDA), Material Transfer Agreements (MTA), consulting contracts, inter-institutional contracts, sponsoring, donations. Please do not include the contracts already considered for 4.1 and do not include license, option and sales agreements.

Comment 4.1 - 4.3
(e.g. restrictions/regulations of your institution. Knowledge of ALL contracts or only contracts above a certain amount)

5. Patent-Related Activities

5.1 Number of invention disclosures received by your TTO [pub]

5.2 Number of priority applications filed by your TTO
Note: Priority application being the very first application in any patent office.

5.3 Overall number of active patent cases at the end of last year managed by your TTO
Note: Active patents cases are pending patent applications or granted patents on an invention (patent family). Applications in various countries on one invention (claiming the same priority date) count as one patent case.

6. Patenting Costs and Legal Fees

6.1 Amount spent by your TTO / institution on patenting costs and external legal fees CHF
Note: Amount should include all external costs for patent filing, prosecution, maintenance, litigation, expenses or costs for drafting or support in negotiation of contracts.

6.2 Amount of patenting costs and legal fees invoiced to commercialization partners CHF
Note: Amount should not include patenting costs or legal fees paid directly by licensees or external partners to patent attorneys, patent offices or other service providers.

7. License, Option and Sales Agreements

7.1 Number of license / option / sale agreements of protected or unprotected IP your TTO did execute [pub]

Note: Please count only the agreements for different technologies, i.e. 30 licenses for the same software library count as one agreement. If a license agreement is combined with a research agreement (e.g. advanced sale of the results of a research project), this contract shall count only as research contract and should not be included in this question unless the invention / software that is licensed / sold exists already at the execution date of the research contracts (background IP).

Of these license / option / sale agreements, how many were licensed to SME, how many to large companies or public institutions?
Note: Companies with 250 or less employees should be considered as SME.

SME:
Large Company:
Public Institution:
Multiple Partners:
Don't know:

7.2 Number of license / option / sale agreements including equity?
Note: Equity shall mean the ownership of interest in a company such as shares, options, warrants, etc. in consideration for granting a license or sale of IP.

7.3 Overall number of license/option/sale agreements active as of December 31 last year

Comment 7.1 - 7.3
(e.g. large variations to previous years, special situation, i.e. with free software licenses, openBSD, etc)

8. Number of License Agreements

8.1 Total number of license / option / sale agreements yielding revenues

8.2 Total number of license / option / sale agreements yielding running royalties
Note: Running royalties are based on product sales and are only due after the launch of a product in the market.

9. Start-up companies (*)

9.1 Total number of start-up companies formed at your institution [pub]

(A) Of these start-up companies, how many are dependent on license / option / sale agreement(s) with your institution?

(B) Of these start-up companies, how many are dependent on unprotected know-how or technology of your institution (without formal agreement)?

9.2 Number of new start-up companies in which your institution holds equity

(*) As "Start-up company" all enterprises should be considered, that had their first entry in the trade registry in the previous year and that have a business case dominantly based on research of your organisation and that have at least one (co-)founder with affiliation to your organisation (employee, graduate, alumnus).

10. Post-Licensing Activities

Number of your institution's licensed technologies that became available for consumer or commercial use last year
Note: If you have success cases for publishing in the report, please use the template sent to you or contact swiTT.

Comments

(If you want to bring additional comments or suggestions to the attention of the team of the swiTTreport, please post them here)

swiTT
swiss technology transfer association

swiTT, the Swiss Technology Transfer Association, is the association of the professionals in Switzerland dealing with the interaction between public research and industry. swiTT currently has more than 120 members from all parts of Switzerland. Most of them work in technology transfer at public esearch institutions, others are employed in the private sector. For further information about swiTT, please refer to **www.swiTT.ch.**

Among other services, swiTT operates swiTTlist, a unique portal with current technology opportunities from Swiss public research institutions available for licensing and development by industry. To search this opportunity database please visit **www.swiTTlist.ch.**

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- DEVELOPMENT
- SERVICES
- DIALOGUE

Facilitates and strengthens COOPERATION and technology transfer between Swiss public research institutions and the private sector;

Offers professional DEVELOPMENT to its members and other practitioners involved in technology transfer within public institutions and the private sector;

Provides SERVICES of common interest to its members, their institutions and other stakeholders involved;

Maintains an active DIALOGUE with research institutions, the private sector and the authorities to foster optimal processes and regulatory framework/regulations.

IMPRESSUM

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