swiTTreport2024

SWISS TECHNOLOGY TRANSFER REPORT

swiss technology transfer association

CASE STUDY

Empa
Materials Science and Technology

Perovskia

PEROVSKIA SOLAR – A SOLAR CELL FOR EVERY DEVICE

Problem – Challenge

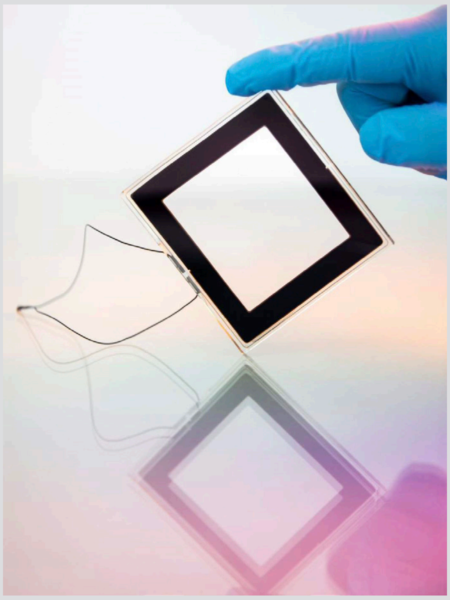
For a successful energy transition, highly efficient and versatile solar cells are a necessity. The vast majority of today's solar cells are silicon-based cells; their upper limit for energy conversion efficiency achieved in plain sunlight has constantly increased; in ambient light, the efficiency drops substantially. Thus more efficient solar cells, especially under poor lighting conditions, are urgently needed.

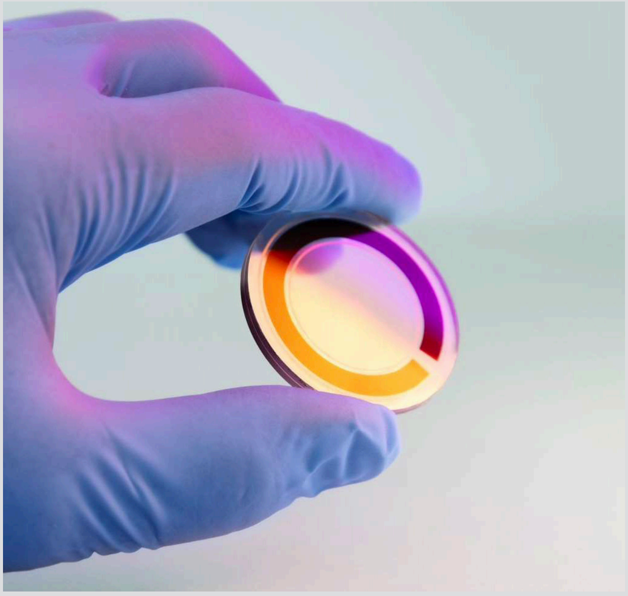
Solution

The solution could be perovskites, a class of materials with a unique crystal structure. Perovskite solar cells have reached record-breaking efficiencies exceeding 25 % in just a decade of research and development. Another advantage: Owing to their extraordinary ability to absorb visible light, perovskite cells produce enough electricity even in low-light conditions such as homes and offices. And, last but not least: Silicon solar cells usually require high-purity monocrystals produced at high temperatures. Perovskite thin films, on the other hand, can be printed, with a much lower CO_2 footprint.

Perovskia Solar, an Empa spin-off, develops and manufactures digitally printed, customizable perovskite solar cells for original equipment manufacturers. Their vision is to enable a solar cell on every device and thus revolutionize the way we power our digital lifestyles.

Perovskia solar cells are tailored to integrate seamlessly with electronic devices, internet of things (IoT) and sensors. And being digitally printed in various shapes and sizes, their versatile solar cells offer high performance at low costs. The startup company is off to a good start: It already supplied a double-digit number of paying customers with their printed solar cells. Since then, the indoor solar cell company has been gaining ground worldwide, with customers in Japan, Korea, India, Europe and the US, mainly from the industrial IoT, and consumer electronics segments. From January 2024, the company started setting up a new factory in Aubonne (VD) with the goal of printing a million of its custom-designed perovskite devices a year. There are already plans to automate the back-end production by the end of the year. Perovskia is currently fundraising to scale its team and cater to the customer needs.





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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 one university 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 2023:

2874	New Research Projects
598	Invention Disclosures
285	Priority Patent Applications
188	License & Option Agreements
92	Start-Ups founded

ZUSAMMENFASSUNG

Der jährlich publizierte "swiTTreport" ist die umfassendste Analyse der Technologietransfer-aktivitäten 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 der beiden ETHs (zusammengefasst unter Universitäten), von einer Fachhochschule (UAS) und von drei Forschungsinstitutionen des ETH-Bereichs (RI).

Insgesamt rapportierten die teilnehmenden Institutionen die folgenden Kennzahlen über ihre Technologietransferaktivitäten im Jahr 2023:

2874	Neue Forschungsprojekte
598	Erfindungsmeldungen
285	Patentanmeldungen
188	Lizenz- & Optionsvereinbarungen
92	Start-Ups gegründet

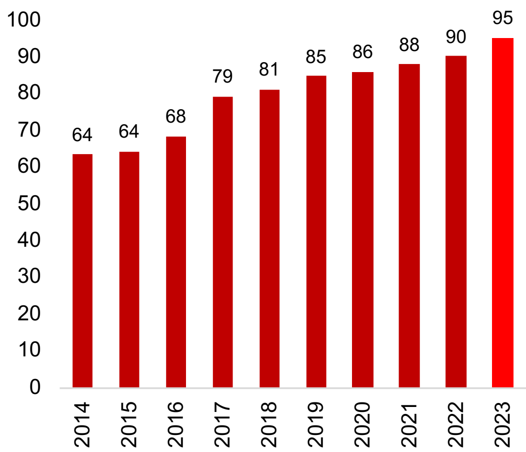
RÉSUMÉ

L'analyse présente est la plus exhaustive connue sur les activités de transfert de technologies réalisées par les institutions publiques de recherche suisses. Ce rapport couvre deux thématiques principales: les contrats de recherche de ces institutions avec des partenaires privés ou publics et les activités liées à la valorisation via le secteur privé des résultats de recherche obtenus par ces institutions. Le rapport désigne collectivement ces collaborations et activités de valorisation sous les termes de transfert de technologies (TT).
Les données présentées proviennent de sept universités cantonales et deux Ecoles Polytechniques fédérales (Universités), d'une université de sciences appliquées (UAS) et de trois institutions de recherche dans le domaine des Ecoles Polytechniques Fédérales EPF (RI).

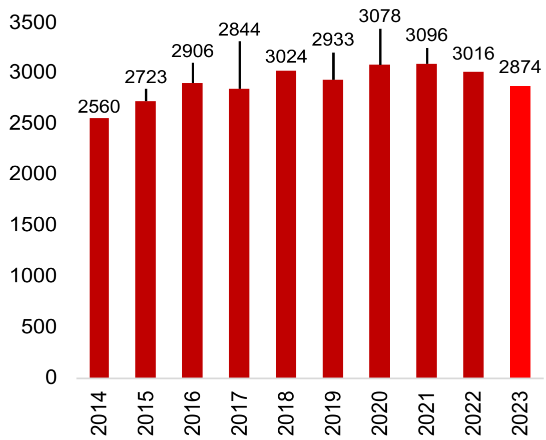
Dans l'ensemble, les personnes interrogées ont communiqué les chiffres clés suivants sur les activités de TT en 2023:

2874	Nouvelles collaborations de recherche
598	Déclarations d'invention
285	Demandes de brevets
188	Contrats de licence et accords d'option
92	Créations de start-ups

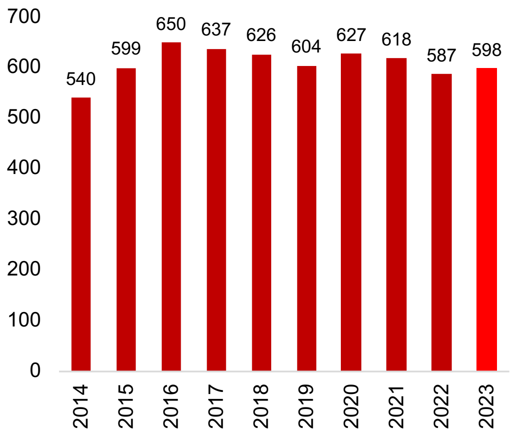
Full Time Equivalents (total)



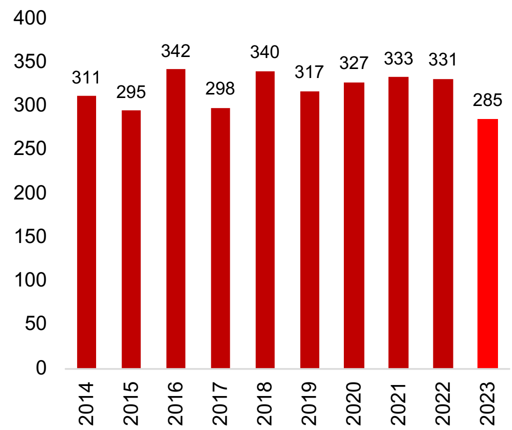
Research Contracts (total)



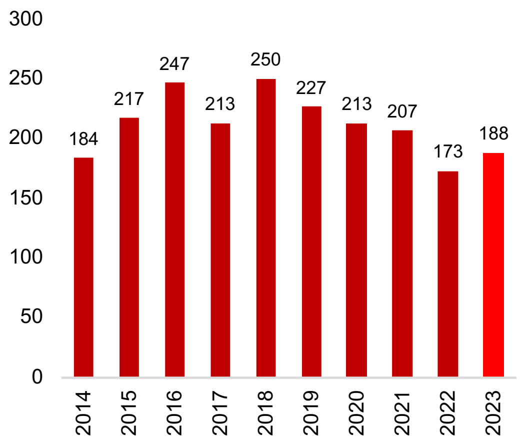
Invention Disclosures (total)



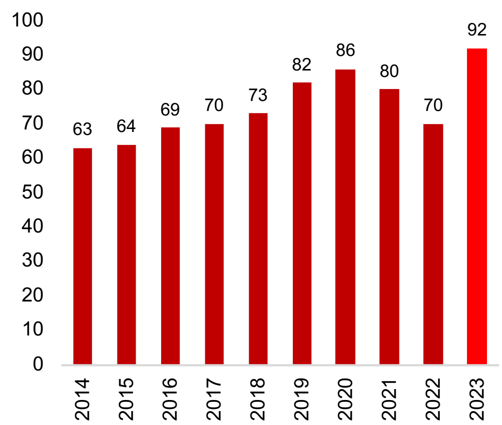
Patent Applications (total)



License Contracts (total)



Start-Ups (total)



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

CASE STUDY

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UNIVERSITÄT BERN

peri vision

PERIVISION – REIMAGING VISION CARE FOR THE 21ST CENTURY

Problem – Challenge

Eye conditions are on the rise. Currently 2.2 billion people suffer from vision impairments of which 50 % could be prevented or cured according to the World Health Organization. This number is growing due to our ageing populations and modern lifestyles.

There are 100M people suffering from glaucoma (and many more who don't even know it yet), 196 M people suffering from AMD, and 300M people who are colour blind. The global population over 65 years old will double by 2050, which will increase these numbers drastically. It is estimated that the demand for eye exams will increase by 15 M / 25 % in the US by 2030.

Current testing standards are not fit for the 21st century. They require stationary and resource-intense workflows and often produce limited insights.

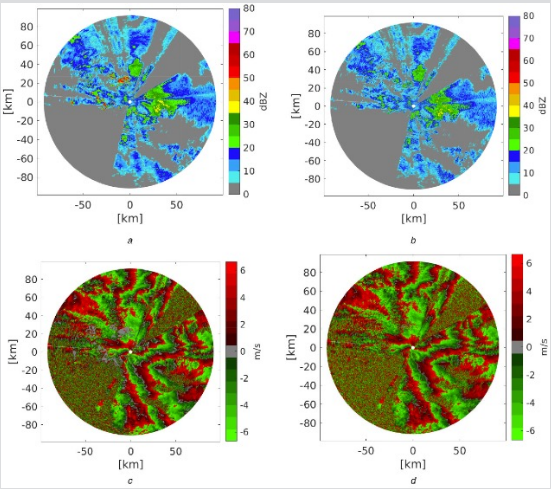
This leads to bottlenecks in clinics and limited patient access to eye testing & adequate treatment. In the US there are between 5 to 10 k ophthalmologists missing and in the UK, the NHS has a backlog of appointments for 633 thousand patients.

Solution

Perivision combines artificial intelligence, virtual reality, and cloud computing to reimagine how doctors test and understand vision. Eye doctors easily configure eye tests on portable VR headsets and subsequently analyze the results on a cloud platform. In the backend, AI algorithms optimize the tests, automate assistance, control quality and provide valuable insights for clinical decisions.

Our first product is a VR visual field for ophthalmologists and optometrists specialized in glaucoma, VisionOne™ is the VR visual field platform with industry-leading speed and accuracy. We combine patented AI, Swiss engineering, and international clinical validation to deliver highly reliable results and strong correlation to the gold standard.

We develop our solutions with leading clinics and in collaboration with eye doctors, technicians and patients. Our technology has been validated in clinical studies and we publish our research in peer-reviewed publications.



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 2024 and asked to provide data on their technology transfer (TT) activities for the year 2023. 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 one individual department of 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 types UNI and RI of institutions covered in this survey (Appendix 2, see end note). For those institutions that agreed to disclose individual data some key figures are listed in Appendix 3.

Comments 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.

> NOTE: In 2024, most of the seven universities of applied sciences could not provide data for the report. In order to show an appropriate development of the technology transfer indicators over the previous ten years, the report represents the aggregate data for types UNI and RI only.

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. Three of nine TTO at Universities also provided support for the coaching of start-up projects.

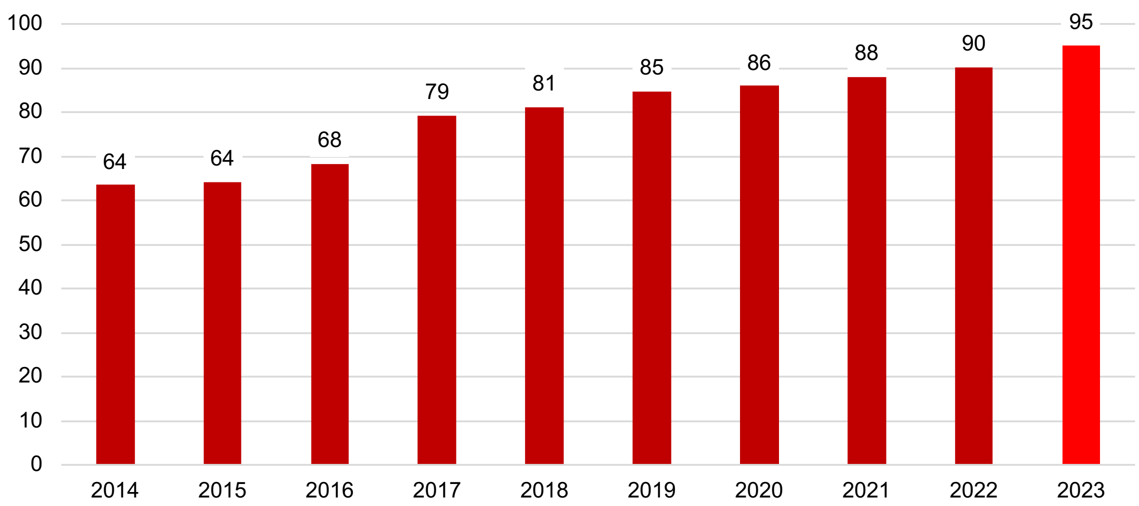
From the respondents one UAS TTO and all RI TTO offer support for research collaborations, deal with the management of IP and support the commercialization of IP. Coaching of start-up projects is offered by one UAS TTO and one RI TTO.

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. At some institutions, start-up projects are handled by dedicated organizations such as business incubators.

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



3. RESEARCH CONTRACTS WITH PARTNERS

3.1 Research Contracts Handled by the TTO

In 2023, the UNI and RI TTO handled a total of 2874 research contracts with economic and public partners. Research contracts handled by UNI decreased by 6.7 % and research contracts handled by RI increased by 4.6 %.

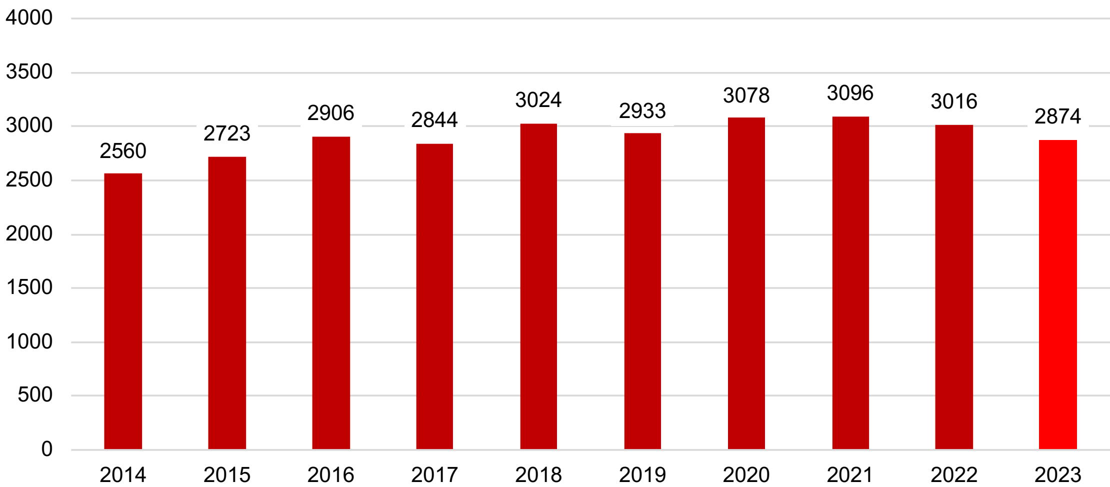
This number includes collaboration agreements, clinical trial agreements, Innosuisse IPR and EU collaboration agreements. SNSF projects (with funding provisions) are only included in these numbers if they involve multiple partners and therefore a collaboration agreement (Fig. 2).
Research collaborations 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 2023, the institutions reported altogether 2905 such other types of TT agreements (+20%).

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

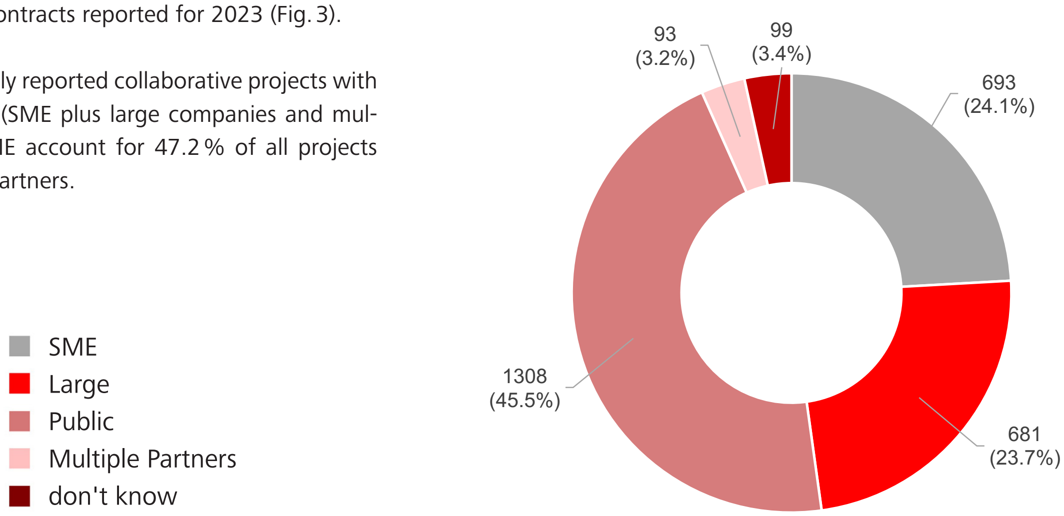


3.2 Type of Collaboration Partners

With respect to the type of collaboration partner the small- and medium-sized enterprises (SME), i.e. companies with fewer than 250 employees, account for 24.1 % of total research contracts reported for 2023 (Fig. 3).

If one considers only reported collaborative projects with the private sector (SME plus large companies and multiple partners), SME account for 47.2 % of all projects with commercial partners.

Fig.3: Partners in Research Contracts



CASE STUDY

MICTHERA – MICROBIAL DERIVED THERAPEUTICS

Problem – Challenge

Prostate cancer (PC) is the most common cancer in men and a major cause of global mortality within the male population. PC incidence in Europe has doubled since 1995, and every year 1.4 M new cases are diagnosed worldwide. While most PC patients benefit from current therapies, relapses remain high, posing significant therapeutic challenges. Scientists at IOR discovered that gut microbiota is a key mechanism of resistance in PC. However, today's microbiota-targeting therapies face several challenges, particularly in terms of their applicability and scalability.

Experiments with EG-011 in the IOR laboratory

Solution

MicThera is a Spin-off of the Institute for Oncology Research (IOR) – affiliated to the Università della Svizzera italiana (USI). MicThera is developing Microbial Derived Therapeutics to treat primarily prostate cancer, by studying a particular bacteria signature associated with increased survival in PC patients at molecular level. The core technology has been discovered in the laboratory of Prof. Andrea Alimonti at IOR, is patent protected and exclusively licensed to MicThera.

MicThera is actively engaged in R&D that focuses on the identification and validation of microbial effector molecules with potent anticancer and antibacterial properties. By developing microbial-derived therapeutics MicThera aims to fill the treatment gap for conditions where gut microbiota is pivotal, circumventing the challenges of existing microbiota-targeting therapies like prebiotics, probiotics, and fecal microbiota transplants.

The company was founded in 2023, and the team is lead by Dr. Nicolò Pernigoni. MicThera successfully obtained 1st place in the Boldbrain Startup Challenge and is currently incubated at the USI Startup Centre, continuing to advance the understanding of microbial effector molecules to treat cancer. MicThera has secured an investment seed round of one million Euro from a biotech-focused fund.

CASE STUDY

ETH zürich

ZSR ZURICH SOFT ROBOTICS

ZURICH SOFT ROBOTICS – DYNAMIC BUILDING FACADES

Problem – Challenge

Dynamic building facades such as shades, mirrors or solar panels have fascinated architects again and again. Changing the visual perception of a building over time or even changing façade properties to improve energy efficiency and regulate daylighting can significantly improve a building's design and the comfort of it's occupants. However, previous implementations, engineered mostly for a single project application have struggled with long term operation, often suffering mechanical failure. Hard actuators are good at positioning and locking a configuration but are incapable of absorbing repeated mechanical shocks.

Solution

The combination of a hard actuator with a soft actuator improves the performance. Soft actuators excel in absorbing mechanical shocks and damping of vibrations. The combination of both actuator types makes dynamic elements robust and reliable.

More precisely, a hard pivotal joint is combined with a soft pneumatic actuator. The joint prevents motion along and rotation around the longitudinal axis. At the same time a pneumatic control system adjusts the pressure in the surrounding pneumatic chambers. A difference in the pressure between chambers induces bending.

Founded in 2022, the ETH spin-off Zurich Soft Robotics uses this technology for Solskin, which is a climate-adaptive building skin. The actuators move lightweight PV panels and are mounted as prefabricated units onto building façades. Solskin stands for efficient solar energy production and intelligent shading. It significantly reduces the operational energy consumption of buildings and prevents overheating in the summer.

In 2025, the spin-off will install 1'300 m^2 of Solskin on its first flagship project for KELLER Druckmesstechnik AG in Winterthur. The spin-off will also implement intelligent AI algorithms for energy and comfort optimization within an Innosuisse project with ETH Zurich.

Hard-soft actuator with joints for precision movements and pneumatic chambers for adjusting the stiffness and effectuating bending motions

Proof-of-concept with a demonstrator set-up at NEST, Empa. Image: Roman Keller

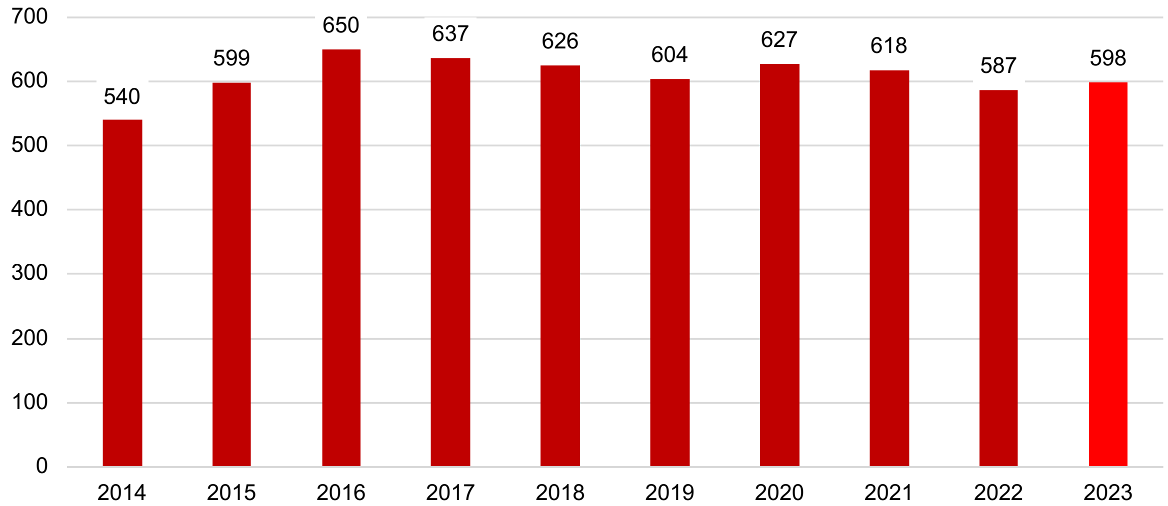
4. COMMERCIALIZATION ACTIVITIES

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.

Fig.4: Number of Invention Disclosures



4.1 Invention Disclosures

A total number of 598 invention disclosures were reported by UNI and RI for 2023, a slightly increased number compared to the previous year (Fig. 4).

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.

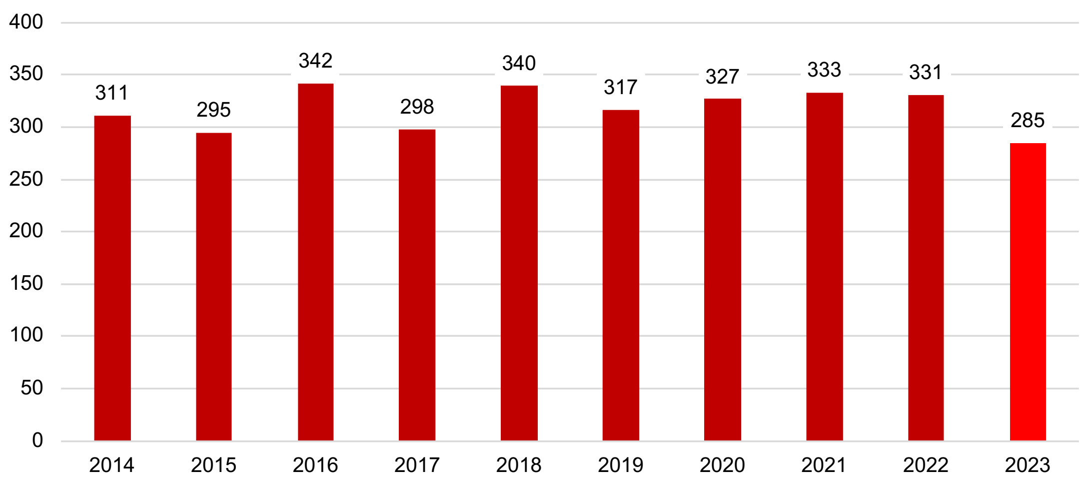
Moreover, many companies will not consider evaluating a new technology if it is not protected by a patent. Thus, patenting activities of PRO can be a prerequisite for entering into a partnership with an industrial partner, however the budget of the TTO must allow for patenting. The reported number of 285 priority applications filed in 2023 by UNI and RI is a decrease (ca. 13.5 %) compared to the previous years (Fig. 5).

4.2.2 Patent Portfolio – Active Patent Cases End of 2023

At the end of 2023, the institutions participating in the survey reported 3307 (-3.0 %) active patent cases which were either licensed to a company or for which they were searching for a licensee. Due to cost issues patents are usually left to expire when no licensee can be identified prior to the nationalization phase.

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 2023, overall 188 (+6.2 %) new IP agreements, usually licenses, were reported by UNI and RI, in a few cases the agreements involved a sale of the IP rather than a license (Fig. 6). In total 84.0 % 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 by UNI and RI at the end of 2023 was reported as 1583 (+6.6 %) cases.

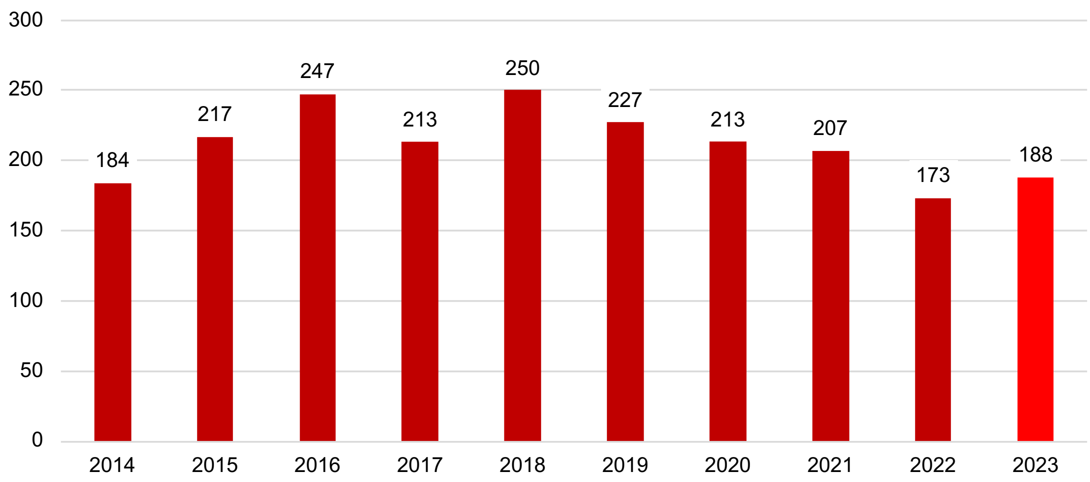
Of these active licenses 31.6 %, namely 500 cases resulted in license income to the institutions and the researchers involved This figure has increased continuously in the past years in line with the growing number of products sold on the market that are based on research results of PRO. In the other 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 resp. ask for 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.

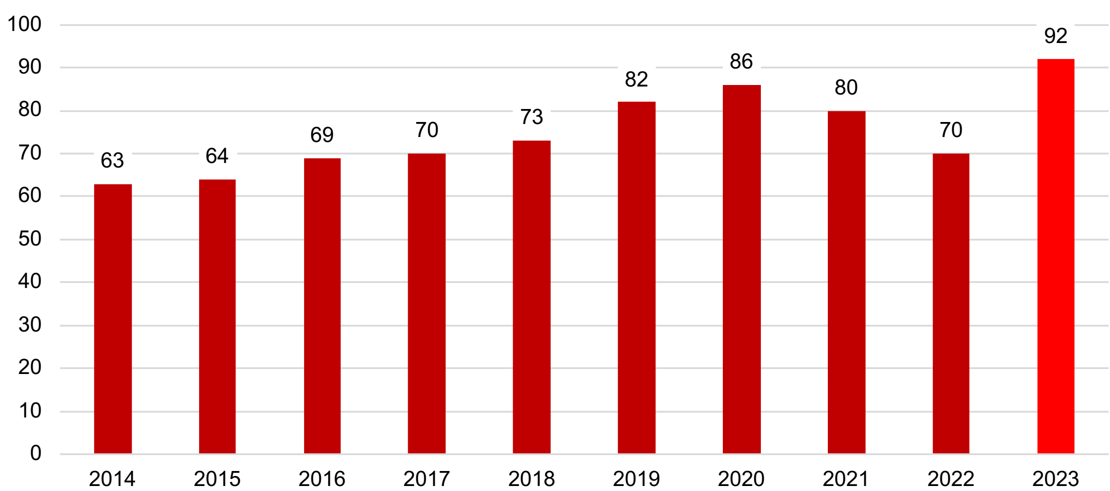
Fig. 6: Number of new Licenses, Option or Sales agreements for Intellectual Property Rights (IPR)



4.4 Start-up Companies

In 2023 the TTO reported a total of 92 (86 by UNI and 6 by RI) new start-up companies (+31.4 %), whereby 34 of these companies (37.0 %) 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

ASTRA THERAPEUTICS – PRECISION-ENGINEERED DRUGS

Problem – Challenge

Eukaryotic pathogens cause a wide range of infections in humans, animals, and plants, leading to debilitating diseases, crop damage, and significant economic losses. Despite decades of relentless efforts, protozoan parasites such as Plasmodium, Toxoplasma, Babesia, Cryptosporidium, and Eimeria continue to pose significant global health challenges. Additionally, other pathogens such as roundworms and flatworms, are of major concern in parasitic infections, especially with the emergence of drug resistance. There is a lack of safe and effective drugs, and no broadly applicable vaccines exist for any of these diseases.

Solution

Using technologies and infrastructures available at PSI, scientists and ASTRA Therapeutics founders Natacha Gaillard and Ashwani Sharma have developed and refined a technology leveraging the subtle sequence differences between tubulins in parasite pathogens and their hosts to enable precise inhibitor design through atomic-scale drug engineering.

The microtubule cytoskeleton, an essential component of the intricate cellular machinery in living organisms, plays a critical role in cell structure division, transport, tissue development and neuronal function, making it indispensable for any organism.

Throughout their pathogenic evolution, eukaryotic pathogens have acquired notable modifications in the sequence, structure, and function of their cytoskeleton, distinguishing them from their host organisms.

ASTRA Therapeutics' technology exploits these unique microtubule features to develop targeted therapeutic interventions against eukaryotic pathogens.

CASE STUDY

NEURAL CONCEPT – EMPOWERING ORGANIZATIONS WITH ENGINEERING INTELLIGENCE TO REVOLUTIONIZE PRODUCT DEVELOPMENT

Improving 3d modeling

Founded in 2018, Neural Concept is a leading company in Engineering Intelligence, transforming the way companies develop products by integrating AI at the core of their processes. Our mission is to help engineering organizations meet the demands of modern, fast-paced markets by drastically reducing development cycles, improving product performance, and accelerating innovation.

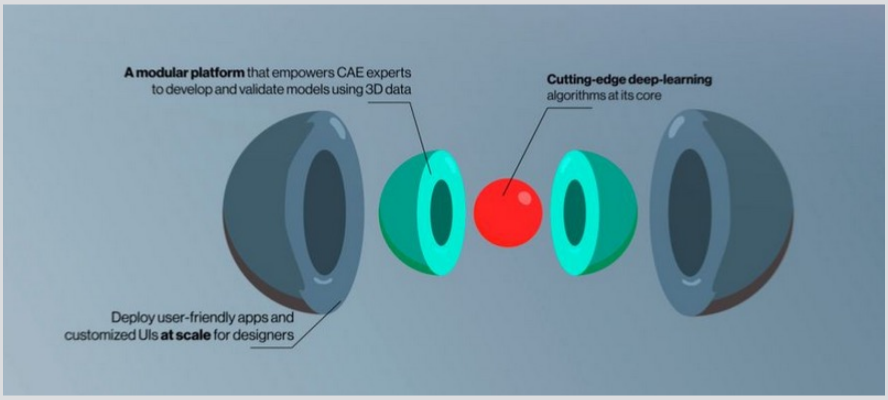
Neural Concept's end-to-end platform enables organizations to fully leverage their data and streamline their design processes through advanced Deep Learning algorithms. Our technology optimizes complex design tasks and generates actionable insights directly from CAD data, reducing development times by up to 75% and enhancing product attributes such as efficiency, safety, and aerodynamics. By automating and scaling the engineering lifecycle, NC empowers teams to achieve a 10x acceleration in their work while maintaining the flexibility to adapt to industry-specific needs.

Neural Concept collaborates with 40% of the largest European and Asian automotive OEMs, as well as 25% of the world's top 100 tier-1 suppliers. Spun out from the Swiss Federal Institute of Technology in Lausanne (EPFL), Neural Concept is supported by world-class investors, including Forestay Capital and the D. E. Shaw group. NC continues to lead the industry in AI-driven product development by delivering innovative solutions that ensure scalability, sustainability, and competitive advantage for engineering teams worldwide.

Guide designers faster towards radically better concepts by deep-learning

NC is operating from design and simulation data to production, as an interactive next generation product development platform. It is allowing simulation engineers and data scientists to manage efficiently data pipelines, 3D machine learning models and optimization campaigns. It enables them to power next-generation product development processes with industry-leading AI.

NC offers a wide variety of applications, such as from external aerodynamics, heat exchangers, hydrodynamics, turbo machineries. NC has achieved an ISO27001 certification and has currently closed a series B financing round of $27M.



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
Université de 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	No data
Fachhochschule Nordwestschweiz (FHNW)	TTO	No data
Ostschweizer Fachhochschulen (OST)	TTO	No data
Zürcher Hochschule für Angewandte Wissenschaften (ZHAW)	Ressort F&E	Only data on TT FTEs (School of Engineering, Life Sciences, Facility Management and the Ressort F&E)
Lucerne University of Applied Sciences and Arts (HSLU)	Ressort F&E	No data
Haute Ecole Spécialisée de Suisse occidentale (HES-SO)	Tech Transfer Fribourg	No data
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 TTO	Complete data
Swiss Federal Institute of Aquatic Science and Technology (Eawag)	Empa-Eawag TTO	Complete data
Paul Scherrer Institut (PSI)	PSI TTO	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 2014 – 2023

All Public Research Organisations	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time equivalents (FTE)	63.5	64.3	68.4	79.3	81.2	84.9	85.5	88.1	90.3	95.2
Research contracts (incl. EU contracts)	2560	2723	2906	2844	3024	2933	3078	3096	3016	2874
Invention disclosures	540	599	650	637	626	604	627	618	587	598
Priority patent applications	311	295	342	298	340	317	327	333	331	285
Active patent cases end of the year	1960	2182	2388	2505	2567	2696	2776	2960	3408	3307
License agreements	184	217	247	213	250	227	213	207	173	188
Active license agreements end of the year	1435	1472	1588	1412	1541	1647	1462	1366	1485	1583
License agreements with revenues in resp. year	373	246	461	450	380	400	442	605	510	500
New start-ups	63 (39)	64 (41)	69 (46)	70 (51)	73 (40)	82 (58)	86 (53)	80 (32)	70 (28)	92 (34)

Universities	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time equivalents (FTE)	56.1	55.5	59.2	70.2	70.3	73.7	74.5	77.1	79.3	84.1
Research contracts (incl. EU contracts)	2195	2303	2465	2435	2574	2508	2603	2548	2493	2327
Invention disclosures	508	565	606	593	592	568	589	579	558	571
Priority patent applications	281	262	320	271	314	293	301	307	304	271
Active patent cases end of the year	1839	2008	2202	2318	2376	2492	2560	2743	3179	3074
License agreements	168	192	229	198	228	206	189	173	163	158
Active license agreements end of the year	1320	1352	1478	1313	1438	1543	1393	1306	1430	1489
License agreements with revenues in resp. year	339	203	410	429	357	373	414	584	491	470
New start-ups	61 (38)	58 (41)	64 (44)	61 (44)	71 (38)	78 (54)	80 (49)	77 (32)	65 (27)	86 (30)

UAS	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time equivalents (FTE)	22.2	24.9	24.0	21.6	30.0	28.4	16.2	14.6	n.a.	n.a.
Research contracts (incl. EU contracts)	677	574	442	727	871	944	353	372	n.a.	n.a.
Invention disclosures	10	9	9	10	36	27	7	4	n.a.	n.a.
Priority patent applications	1	3	1	2	17	12	7	2	n.a.	n.a.
Active patent cases end of the year	9	9	41	14	44	48	22	23	n.a.	n.a.
License agreements	3	3	4	2	23	10	6	8	n.a.	n.a.
Active license agreements end of the year	2	2	18	1	17	16	5	1	n.a.	n.a.
License agreements with revenues in resp. year	3	3	1	1	9	15	1	1	n.a.	n.a.
New start-ups	18 (10)	9 (6)	5 (2)	2(1)	16 (4)	20 (5)	4 (2)	3 (2)	n.a.	n.a.

RI	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Full-time equivalents (FTE)	7.4	8.8	9.2	9.1	10.9	11.2	11.0	11.0	11.0	11.1
Research contracts (incl. EU contracts)	365	420	441	409	450	425	475	548	523	547
Invention disclosures	32	34	44	44	34	36	38	39	29	27
Priority patent applications	30	33	22	27	26	24	26	26	27	14
Active patent cases end of the year	121	174	186	187	191	204	216	217	229	233
License agreements	16	25	18	15	22	21	24	34	10	30
Active license agreements end of the year	115	120	110	99	103	104	69	60	55	94
License agreements with revenues in resp. year	34	43	51	21	23	27	28	21	19	30
New start-ups	2 (1)	6 (0)	5 (2)	9 (7)	2 (2)	4 (4)	6 (4)	3 (0)	5 (1)	6 (4)

For new start-ups the numbers in parentheses refer to start-ups on basis of a formal license.
The number of the institutions that participated in the survey varies between years.

APPENDIX 3 – KEY PARAMETERS FOR INDIVIDUAL INSTITUTIONS FOR 2023

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	15.3	261	126	79	46	32
Eidgenössische Technische Hochschule (ETH) Zürich	ETH transfer	1995	29.9	687	172	87	31	43
Universität Basel / Universitätsspital Basel Universität Bern / Inselspital Universität Zürich / Universitätsspital Zürich	Unitectra	1999	13.2	1028	163	75	56	14
Université de Genève / Hôpitaux universitaires de Genève	Unitec	1998	10.2	63	55	10	13	2
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	2000	10.2	224	34	11	6	1
Università della Svizzera italiana (USI) / Institute for Research in Biomedicine (IRB) / Institute for Oncology Research (IOR)	SRIT	2018	4.1	47	6	3	5	2
RI								
Swiss Federal Institute for Materials Science and Technology (Empa)	Empa-Eawag TTO	2005	4.1	238	22	10	14	4
Swiss Federal Institute of Aquatic Science and Technology (Eawag)	Empa-Eawag TTO	2001	1.7	55	0	1	0	0
Paul Scherrer Institut (PSI)	PSI TTO	1999	5.3	254	5	3	16	2

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
UNI	Cantonal Universities and Swiss Federal Institutes of Technology

CASE STUDY

FLUOSPHERA – ADVANCED 3D TISSUE MULTIPLEXING TECHNOLOGY

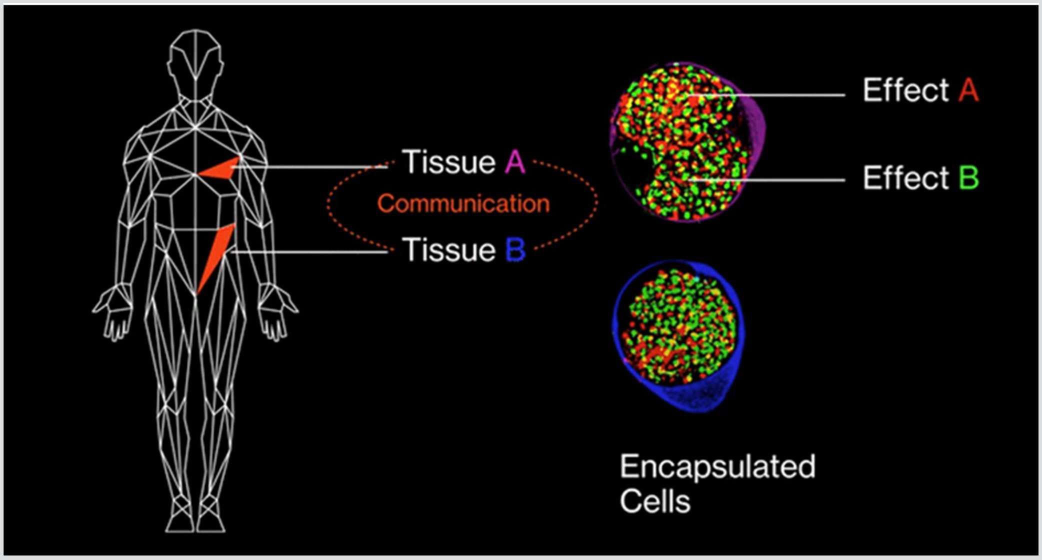
Problem – Challenge

Traditional drug testing methods, primarily reliant on animal models and simple cell cultures, often fail to accurately replicate human biology, leading to high failure rates in drug development. These inefficiencies are costly, time-consuming, and can have significant ethical concerns.

Solution

Fluosphera's advanced 3D tissue multiplexing technology mimics the natural physiology of the human body, enabling its partners to study human response to systemic drug delivery in an easy-to-use, high-throughput in vitro model. How does it work? Human tissues of different types are encapsulated into permeable color-coded capsules that enable tissue tracking. Compounds are applied to the cell culture, mimicking human systemic drug treatment. Biological activities are detected using sophisticated microscopy analyses, and post-assay tissue sorting enables analysis of both tissue-specific and systemic biological activities.

How will the technology be exploited? Fluosphera was created in 2021 as a University of Geneva spin-off. Its innovative approach has been recognized through awards and support from various Swiss and international organizations including iTeams, iGEM, Venturekick, Mass Challenge, Innosuisse, the Geneva incubator FONGIT and the US accelerator IndieBIO among others. Fluosphera has also gained traction with prominent companies such as Abbvie, Revvity, L'Oréal and Sciomics with which Fluosphera has partnered to apply its technology to realworld problems.



CASE STUDY

Universität Basel

CE LINE

CE-LINE – REAL-TIME MEASUREMENT OF NUTRIENT CONCENTRATIONS

Problem – Challenge

Traditional greenhouse agriculture faces significant hurdles in maintaining optimal nutrient levels. Conventional methods of monitoring nutrient concentrations in irrigation and drain water are labor-intensive, prone to error, and lack real-time insights. Inaccurate nutrient management can lead to suboptimal plant growth, nutrient wastage, and environmental concerns such as leaching. Growers struggle to balance nutrient inputs effectively, resulting in inconsistent crop yields and resource inefficiency.

Solution

CE-Line, which was developed by CE-Line B.V. in collaboration with the University of Basel (Prof. Peter Hauser) presents a groundbreaking solution to the challenges of nutrient management in greenhouses, leveraging advanced Capillary Electrophoresis technology.

CE-Line utilizes a small capillary with a potential difference to separate nutrients in irrigation and drain water. It measures the concentration of all individual nutrient components fully automated without human interference. The data are shared with the cloud and with climate control systems in the greenhouses, for use of automated irrigation and fertilization.

CE-Line empowers growers to optimize fertilization strategies and achieve optimal plant growth in greenhouse agriculture.

APPENDIX 4 – THE QUESTIONNAIRE

swiTT Technology Transfer Survey 2023 (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, optioan 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's vision is to advance Switzerland as a powerhouse of technology transfer, supported by a thriving network of collaboration and shared expertise.

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 PRO, 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 PRO available for licensing and development by industry. To search this opportunity database please visit. **www.switt.ch/swittlist.**

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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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