swiTT**report** 2018

SWISS TECHNOLOGY TRANSFER REPORT

swiTT

swiss technology transfer association

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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 collaborations 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 very actively with partners in the economy. These activities are collectively designated in the report as "technology transfer" (TT) activities. With regard to scientific disciplines, the report mainly focuses on the areas of life sciences, natural sciences and engineering sciences.

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

Although the evolution of the data over the years is reported, caution should be taken when comparing these. Missing or incomplete data from some institutions introduce a bias into the year on year evolution and lead to a clear underestimation of the real situation. The respondents reported their results to swiTT voluntarily based on the questionnaire mentioned in Appendix 4, and the data presented in this report is based on the responses provided as is.

For reasons of confidentiality, the report mainly contains aggregated numbers (Appendix 2). However, some of the key parameters are presented on an individual basis for those institutions that agreed to do so (Appendix 3).

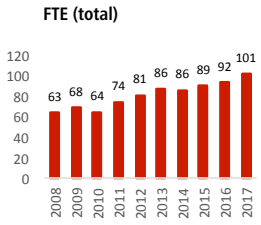
On account of the differences in mission, organisation and objectives of the three types of institution (Universities, UAS, RI), their data are reported separately.

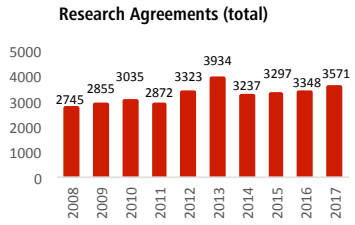
Overall, the respondents reported the following indicators on technology transfer activities in 2017:

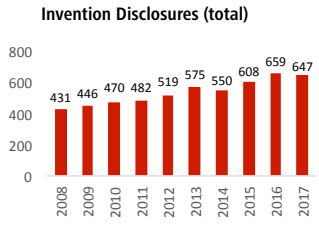
3571 New Research Projects
647 Invention Disclosures
300 Patent Applications
215 License & Option Agreements
72 Start-Ups founded

Larger companies (> 250 employees) and public institutions are the most common cooperation partners of Universities, while RIs and UAS partner mostly with small and medium sized companies (SME) and public organizations. With over 90% of all patent applications filed and of all licenses concluded, Universities account for most of the commercialization activities.

The collaborative culture between academia and industry in Switzerland and the technology transfer performance of Swiss universities and other PRO are important location factors for industry. Easy access to academic researchers and well defined technology transfer processes are important criteria for companies to invest in and to relocate their business to Switzerland. Maintaining a system which is based on fair partnership between academia and industry together with continuous process optimization will be important aspects to further strengthen Switzerland's leading position in the international context.

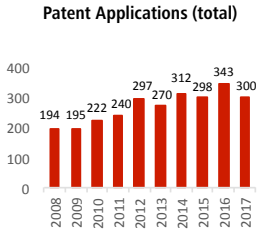


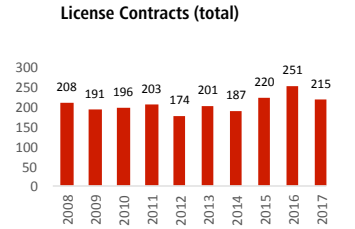


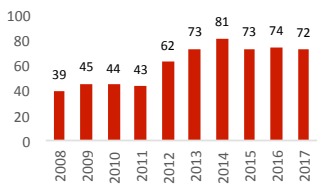


Data of the last ten years showed a solid outcome of the TT activities in Switzerland.

FTE = Full Time Equivalents







RÉSUMÉ

L'analyse présente 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 collaborations 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 avec ces partenaires. Ce rapport désigne collectivement ces collaborations et activités de valorisation sous les termes de transfert de technologies (TT). L'analyse révèle que les institutions suisses coopèrent très activement avec les entreprises et que les activités de TT sont présentes dans tous les domaines technologiques et scientifiques, avec une plus grande représentation dans le domaine des sciences de la vie et de l'ingénierie.

Ce rapport s'appuie sur les données relative aux activités de TT telles qu'indiquées en réponse au questionnaire mentionné à l'Appendix 4. Ces données proviennent de huit universités cantonales et deux écoles polytechniques fédérales (Universités), de six universités de sciences appliquées (UAS) et de trois institutions de recherche dans le domaine des Ecoles Polytechniques Fédérales EPF (RI). Il est à noter que certaines données transmises sont incomplètes ou partielles et que les chiffres présentés dans ce rapport sous-estiment probablement la situation réelle. Par ailleurs, les données de plusieurs institutions n'étaient pas disponibles ou étaient trop fragmentaires pour être incluses. Une comparaison entre les chiffres de l'année 2016 et les années précédentes est fournie pour la plupart des données. A noter qu'une telle comparaison doit être considérée prudemment pour les raisons mentionnées ci-dessus.

Les personnes (en général les responsables des offices de transfert de technologies) ont communiqué à swiTT leurs données annuelles sur une base volontaire. Pour des raisons de confidentialité, ce rapport contient principalement des données accumulées (Appendix 2). Certaines données importantes peuvent toutefois être présentées individuellement quand les institutions ont donné leur accord (Appendix 3).

Compte tenu des différences de missions, d'organisations et d'objectifs des trois types d'institutions analysées ici (universités, UAS, RI), leurs données sont présentées séparément. Dans l'ensemble, les personnes interrogées ont communiqué les chiffres clés suivants sur les activités de TT en 2017:

3571	Nouvelles collaborations de recherche
647	Déclarations d'invention
300	Demandes de brevets
215	Contrats de licence et accords d'option
72	Création de start-ups

Les grandes sociétés (>250 employés) et les institutions publiques sont les partenaires externes les plus fréquents des Universités. Dans le cas des RI et des UAS, la majorité des partenaires externes sont des petites et moyennes entreprises PME (≤ 250 employés) ainsi que les organisations publiques.

Plusieurs études internationales confirment une culture de collaboration bien implémentée entre les milieux universitaires et économiques en Suisse et l'excellente performance des institutions de recherche publiques suisses dans le domaine du transfert de technologies TT. Des règles et pratiques définies en matière de TT constituent des critères importants pour les entreprises qui envisagent de collaborer avec les institutions ou de s'établir en Suisse. Ces pratiques visent à des partenariats équilibrés et motivants entre les milieux universitaires et les entreprises et l'adaptation et l'évolution de ces pratiques sont essentielles pour maintenir, renforcer la position économique de la Suisse à l'échelle internationale.

Voir figures 'données des 10 dernières années' en page 3.

ZUSAMMENFASSUNG

Der jährlich publizierte "swiTTreport" ist die umfassendste Analyse der Technologietransferaktivitäten öffentlicher Forschungsinstitutionen (PRO) in der Schweiz. Dieser Bericht umfasst zwei Hauptbereiche, Forschungskooperationen mit der Wirtschaft und wirtschaftliche Verwertung von Forschungsergebnissen. Diese Aktivitäten werden häufig auch unter dem Begriff „Technologietransfer" zusammengefasst. Der Bericht zeigt, dass die schweizerischen PRO sehr aktiv und erfolgreich mit der Wirtschaft interagieren. Die in der Analyse erhobenen Daten beziehen sich vorwiegend auf die Fachbereiche Life Sciences, Naturwissenschaften und Ingenieurwissenschaften.

Der Bericht umfasst die Aktivitäten von acht kantonalen Universitäten und der beiden ETHs (zusammengefasst unter "Universitäten"), von sechs Fachhochschulen („UAS") und von drei Forschungs-institutionen des ETH-Bereichs („RI").

Allerdings waren von einigen Institutionen nur Teildaten aus einzelnen Bereichen bzw. generell sehr fragmentarische Angaben verfügbar, so dass die effektiven Aktivitäten substanziell höher sind, als in diesem Bericht zusammengefasst. Daten einiger Institutionen waren so unvollständig, dass sie gar nicht berücksichtigt werden konnten. Dies führt dazu, dass die Daten mit jenen von früheren Jahren teilweise nur beschränkt vergleichbar sind.

Die teilnehmenden Institutionen rapportierten die Resultate an swiTT auf freiwilliger Basis und die Daten wurden wie berichtet verwendet. Aus Vertraulichkeitsgründen enthält der Bericht vorwiegend aggregierte Zahlen (Appendix 2). Einige Kennzahlen werden auch auf individueller Basis publiziert, allerdings nur für jene Institutionen, die einer solchen Publikation zugestimmt haben (Appendix 3). Die Daten der unterschiedlichen Arten von Institutionen (Universitäten, UAS, RI) werden im Bericht separat zusammengefasst.

Insgesamt rapportierten die teilnehmenden Institutionen die folgenden Kennzahlen über ihre Technologietransferaktivitäten im Jahr 2017:

3571 Neue Forschungsprojekte
647 Erfindungsmeldungen
300 Patentanmeldungen
215 Lizenz- & Optionsverträge
72 Start-ups gegründet

Grosse Firmen (>250 Angestellte) und öffentliche Institutionen sind die häufigsten Kooperationspartner der Universitäten, während es an den RI und UAS vor allem KMU (<= 250 Angestellte) und öffentliche Institutionen sind.

Die kooperative Kultur zwischen Industrie und Hochschulen in der Schweiz und die ausgezeichneten Transferleistungen der öffentlichen Forschungsinstitutionen sind auch ein wichtiges Kriterium für den Standortentscheid von Firmen. Die weitere Stärkung des partnerschaftlichen Verhältnisses zwischen Hochschulen und Industrie und der entsprechenden Prozesse sind wichtig, um die führende Rolle des Innovationsstandorts Schweiz auch künftig beibehalten zu können.

Eine graphische Zusammenfassung der TTO-Aktivitäten der letzten 10 Jahren befindet sich auf Seite 3.

CASE STUDY

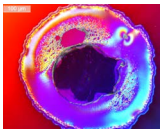
LIDT AND DEGRADATION INSPECTION TECHNIQUE FOR INDUSTRIAL APPLICATIONS

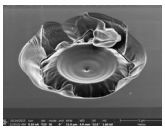
Problem – Challenge

The Alpine Rhine Valley between Liechtenstein and Switzerland has a long tradition in the manufacture and use of optical coatings and coating technology. In order to support the regional industry in this area, a CTI (Innosuisse) project was started in 2014 at the NTB Interstate University of Applied Sciences of Technology, Buchs. In this 3-year project, a consortium of eleven industry partners and four research partners extended a commercially acquired LIDT (Laser Induced Damage Threshold) measuring system to enable the state-of-the-art investigation of the damage behaviour of optical components. For applications where the lifetime of the component is critical, laser damage investigations must be conducted in an environment similar to the operating conditions. Another goal was therefore to extend the test bench to allow degradation testing of the optical components under controlled environmental conditions. .

Solution

Processes for efficient and transparent measurements with a high degree of automation and fast changeover time when switching between different wavelengths have been developed. In addition, a measurement service with fast turnaround time has successfully been established to support the industry with short development cycles. The developed degradation chamber allows tests to be conducted under a variety of different temperature, gas environment and humidity conditions. This allows the development of optical components tailored to the conditions to which they are exposed in laser applications. By providing a world-first set of degradation testing tools combined with extensive measurement services to determine the LIDT of optical components, the competitiveness of Swiss manufacturers of optical components and lasers is enhanced through rapid, targeted and qualified support in qualifying and optimizing coatings and coating processes. The project also gave the consortium of industry partners the opportunity to network and exchange ideas. In addition, highly qualified employees for the optical industry in Switzerland are trained locally and access to the international laser damage community is made possible, thus ensuring innovation development and transfer in the optical industry. The system is already in use in several Innosuisse projects. The project has enabled RhySearch, which has now become an Innosuisse recognized research institute, to initiate several follow-up activities and establish a measurement laboratory for high quality optical components.





CASE STUDY

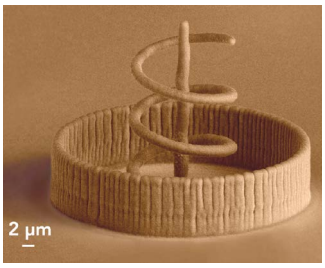
COPPER DEPOSITION TO FABRICATE TINY 3D OBJECTS

Problem – Challenge

In most existing 3D microprinting processes, overhanging structures can be achieved only through a workaround: during the printing process, a stencil manufactured beforehand is used as a placeholder under the overhang that is to be printed. The template must be removed once printing is complete.

Solution

ETH Zurich developed an innovative technology with which the FluidFM µ3Dprinter prints metal by electrodeposition in a liquid bath. The technique is based on a force-controlled hollow micropipette and can even print overhangs without support structures. Briefly, a conductive substrate is placed in a liquid bath. The tip of a micropipette, the so-called FluidFM iontip, enters the liquid bath and acts as a print head. A copper sulphate solution flows slowly and steadily through the FluidFM iontip. Using an electrode, a voltage between the liquid bath and the conductive substrate is applied, causing an electrochemical reaction under the iontip aperture. The copper sulphate emerging from the iontip reacts to form solid copper, which is deposited on the conductive substrate as a tiny voxel. A force-feedback enables the automation of the movement of the FluidFM iontip, allowing researchers to print pure metal 3D objects, voxel by voxel, and layer by layer targeting arbitrary geometries.
This printing technique is a further development of the hollow cantilever-based fluidic force microscopy (FluidFM) developed at ETH Zurich several years ago and commercialized by the ETH spin-off Cytosurge AG. The latest development leads to the FluidFM µ3Dprinter, a very high-precision stand-alone solution to print solid metal objects at the micrometer scale. This unique printing technology is capable of being industrially scalable and has the potential to drive additive micromanufacturing well beyond current technological boundaries.



1. PARTICIPATING INSTITUTIONS AND DATA COLLECTION

Two Swiss Federal Institutes of Technology (ETH) and eight cantonal universities (collectively "Universities"), nine universities of applied sciences (UAS), and three research institutes (RI) in the ETH domain were contacted in spring 2018 and asked to provide data on their technology transfer (TT) activities for the year 2017. 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 all members of Universities and RI, as well as individual departments of seven UAS. The data show that the handling of research collaborations with economic partners and other TT activities varies substantially among different institutions. Of note: not all of them were able to provide a comprehensive overview. *Thus, the data provided in this report are not complete and only summarize the figures reported, while the actual activities at the interface of academia and economy are presumably higher.* Appendix 1 shows the institutions that participated in the survey and comments on the comprehensiveness of the data provided.

The swiTTreport is the most comprehensive study in Switzerland on TT activities of academic and other PRO. The report mostly provides aggregate data for the three types of institutions covered in this survey. 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. At some universities, technology transfer offices (TTO) only handle a part of the collaborative research projects with economic partners. Activities in research and TT at university hospitals are usually closely linked to the respective university, hence the services of these transfer offices are also available to researchers at the hospitals. Data from the hospitals are included in the report, but not all are complete. For example, data from several hospitals do not include clinical research activities.

UAS
The management of TT 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 TT services for the researchers although the scope of services provided differs.

CASE STUDY

SUSTAINABLE "SWISS EBONY" FOR MUSICAL INSTRUMENTS

Problem – Challenge

Like many tropical wood types, ebony is an endangered species that is tricky to use, for instance, in instrument manufacturing. Despite strict trade regulations, ebony stocks are plummeting. Furthermore, ebony in musical instruments such as violins may only be imported into some of the 183 CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) countries if the legal provenance of the material in the finished product can be proven to customs authorities. Therefore, many musicians are reluctant to travel with their instruments as getting them through customs is quite risky. Numerous instruments have already been impounded. However, travelling isn't the only problem. Anyone who deals in these instruments may be liable for prosecution if they are unable to prove the legal provenance of the material. Hence a substitute is urgently needed.

Solution

This is where the Empa and ETH spin-off "Swiss Wood Solutions" comes in. The start-up was founded by researchers from Empa and ETH Zurich. Its product, "Swiss Ebony", consists of modified maple – a sustainable and entirely legal wood-based material. CEO Oliver Kläusler and his team discovered a way to modify Swiss timber so it exhibits the properties of endangered tropical wood, which are crucial for instrument manufacturing. The ebony substitute can already match its natural role model in terms of quality and price. However, the researchers aim for a completely "green" production chain. The development conducted thus far was funded by grants from the Gebert Rüf Foundation, a grant from the Horizon2020 program, and the seed money from the co-founders. Moreover, the spin-off receives coaching from Empa's business incubator glaTec, from the Suisse Innovation Agency Innosuisse, and from Venture Kick.

Violins
Photo: Wilhelm Geigenbau AG

Professionals of PQV playing on Swiss Ebony fittings
Photo: Empa

Master violin, equipped with Swiss Ebony line fittings (pegs, fingerboard, tail piece, chin rest)
Photo: Empa

CASE STUDY

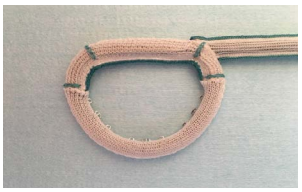
KALIOS, THE FIRST ADJUSTABLE MITRAL VALVE REPAIR DEVICE

Problem – Challenge

Mitral valve regurgitation is a progressive disease that prevents valve leaflets from closing properly. Over time, this leakage leads to heart failure.
Mitral regurgitation or mitral insufficiency affects 8% of people aged over 65. The existing effective treatment consists in reshaping the valve annulus by implanting a Carpentier ring. This requires the surgeon to choose the ring size that best fits the valve. However, since this open-heart surgical procedure is performed under cardiopulmonary bypass, which is not a physiological condition, it is impossible to assess the quality of the mitral repair before the heart beats again. As a consequence, up to 30% of patients leave the operating room with some residual mitral regurgitation and up to 20% may need either medication or a second open-heart surgery within two years.

Solution

Initially designed by Prof. Tozzi in the Cardiac Surgery Department of the CHUV, the adjustable mitral ring "Kalios" was then developed with the support of the company Affluent Medical SA. This innovative device is to be implanted in open surgery with a technique very similar to that of the classical Carpentier ring. However, unlike a conventional ring, it always remains accessible after implantation so that adjustment of the ring shape can be performed. This invention offers the possibility of reshaping the mitral ring multiple times to optimize valve repair using a minimally invasive percutaneous approach within months following the surgery. Kalios is therefore aimed at improving the coaptation of mitral leaflets in order to correct residual and recurrent mitral regurgitations without further surgery. This procedure is considered a major advance in the non-invasive treatment of mitral insufficiency. Kalios was successfully implanted in five patients at the Vienna University Hospital (pilot study).



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 by the higher management is not mandatory, or not all contracts are covered (eg. contracts for EU project or contracts <50k CHF excluded). 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. Eight of nine TTO at Universities also provided support for the coaching of start-up projects.

Four of six UAS TTO and all RI TTO offer support for research collaborations. Five out of six UAS TTO and all TTO of RI deal with the management of IP. The commercialization of IP is supported by all RI TTO but only by two UAS TTO. Coaching of start-up projects is offered by two 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 coaching of start-up projects. To be reported here, the TT activities must account for at least 20 % in this person's job description.

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 also outsource legal issues to external attorneys. At some institutions, start-up projects are handled by dedicated organizations such as business incubators. Study agreements for sponsored clinical trials at university hospitals are dealt with by the legal departments in several institutions. Thus, the actual number of people supporting the transfer activities is larger than the number of FTE reported for the TTO.

The total number of FTE in technology transfer at the participating institutions slightly increased to 100.9 (+9%) in 2017. While the number increased for the UNIs (+19%), it decreased for the UAS (–10%).

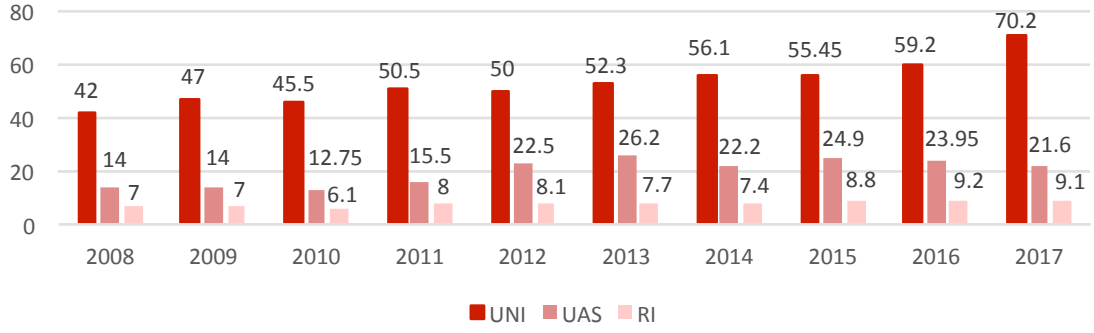


Fig.1:
Development of Staffing Level Full Time Equivalents (FTE)

3. RESEARCH COLLABORATIONS WITH PARTNERS FROM THE ECONOMY

3.1 Research Agreements Handled by the TTO

In 2017, the TTO handled contracts for a total of 3'571 research projects with economic partners, a plus of 7% over the previous year. However, in view of the incomplete data provided by the institutions the year on year comparison should be taken as an approximation. Missing or incomplete data from some institutions introduce a bias into the year on year evolution and lead to a clear estimation of the real situation. The respondents reported their results to swiTT voluntarily based on the questionnaire mentioned in Appendix 4, and the data presented in this report is based on the responses provided as is.

For the Universities the number of new co-operative research projects was 2'435 (-1%). The RI reported 409 (-7%) projects and the participating UAS 727 (+64%). Unfortunately only a minor percentage of data on TT activities in UAS is available for this report. Therefore, the figure cannot be compared easily with previous years. The lack of data results in a significant underestimation of the real situation. Research collaborations between academia and industry are a key aspect of TT, they do indeed represent various possible 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. In addition, the funding of joint projects by partners from the economy may account for a significant contribution to the research budgets of certain PRO.

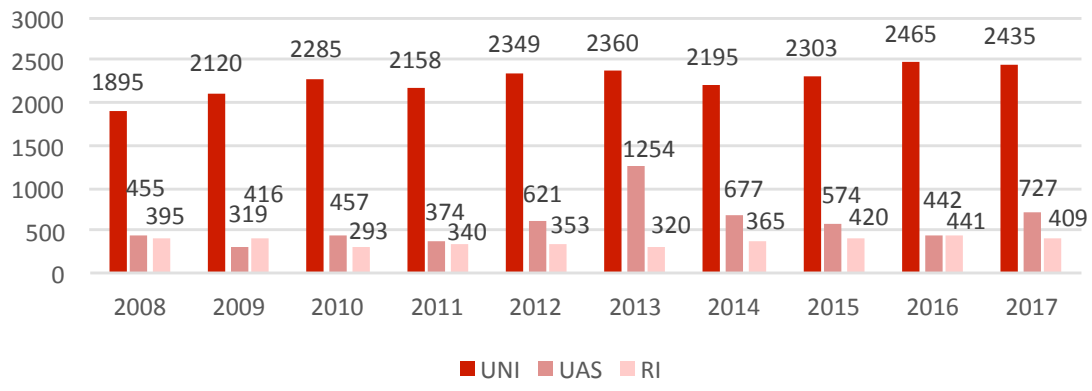
Such collaborations are also a great opportunities to feed and enrich each other in cutting edge innovation areas. In this context, research collaborations are most important for TT.

For the collaborative research projects handled by the TTO, survey respondents reported total cash contributions from collaboration partners in 2017 over 389 million CHF (+/-0%). The average cash contribution of the business partner per project is 151'493 CHF in 2017 and shows an increase in average project value by 24% compared to the previous year. The average cash payments per project at UAS was 82'203 CHF (-27%). The average contribution per project at Universities was 126'453 CHF (+21%), and at RI's 200'000 CHF (-9.7%). Please note that not all institutions provided numbers for the amount of cash payments they received.

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 2017, the institutions reported altogether 3076 (+5.2%) such other types of TT agreements.

In general TTO experience an increase of complexity of the collaborations. Encouraged by funding agencies and translational initiatives, collaborations tend to include more partners. Together with growing expectations in terms of governance this reinforced the role of the TTO, but also puts more strain on them.

Fig. 2:
Number of Research Agreements and EU Contracts handled by TT Offices



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 17.1% (2016 22%) of total projects reported. Higher numbers of projects were performed with large companies (27.6%), and with public institutions (42.5%). The latter including other public national or international research organizations. 3.1% of projects where with multiple partners.

If one considers only reported collaborative projects with the private sector, SME account for 38 % (2016 45%) of all projects with commercial partners.

UAS do not specify the type of partner for a high percentage of the projects.

Fig. 3a: Partners in Research Projects All in 2017

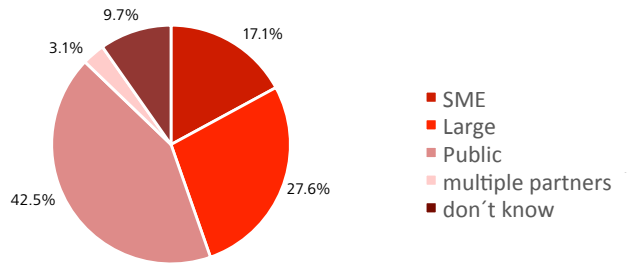


Fig. 3b: Partners in Research Projects of Universities in 2017

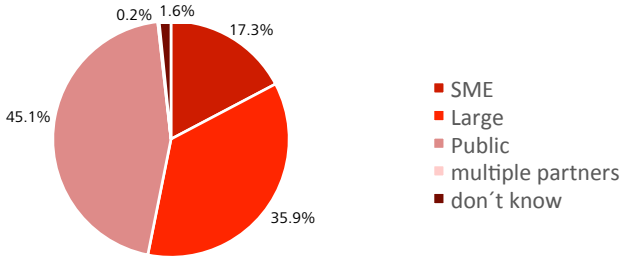


Fig. 3c: Partners in Research Projects of UAS in 2017

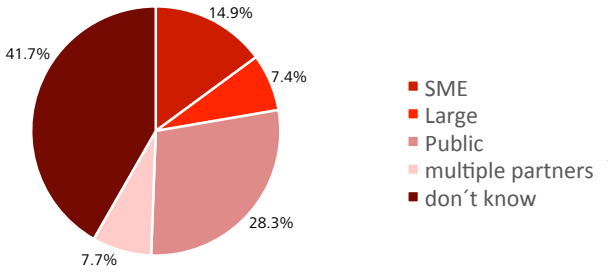
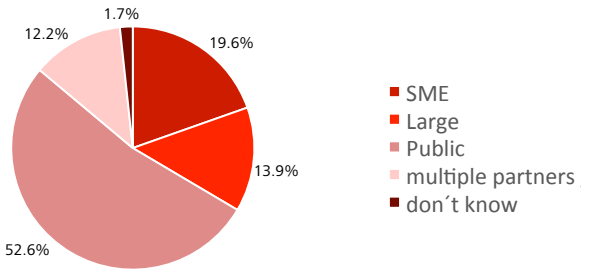


Fig. 3d: Partners in Research Projects of RI in 2017



CASE STUDY

PERSONALIZED BIOENGINEERED SKIN GRAFTS

Problem – Challenge

Every year in the world, more than 50 millions of people suffer from skin defects and need surgical intervention to restore skin function. Skin defects can be either acute (burns & trauma) or elective (reconstructive and ulcers). In many cases, standard of care leaves patients with debilitating scars.

Solution

CUTISS is a Swiss biotech company, spin-off of the University of Zurich (UZH), developing personalized skin graft technologies for the treatment of a large spectrum of skin defects. Its first in line product denovoSkin™ has been tested in a phase I clinical trial on pediatric patients at the University Children's Hospital in Zurich. EU phase II studies are about to start funded by Wyss Zurich, a joint accelerator of UZH and ETHZ. denovoSkin™ has received Orphan Drug Designation for the treatment of burns by Swissmedic, EMA and FDA. In addition, denovoSkin™ promises to improve life quality of elective (reconstructive) patients as well and it can further be developed in terms of complexity by adding pigmentation.
In EU and US about 12 million patients could benefit from CUTISS' technology every year. denovoSkin™ could significantly improve the life quality of patients worldwide by drastically reducing scarring after transplantation.
CUTISS closed a seed financing round of CHF 1 million with the UZH Life Sciences Fund (UZH LSF). UZH LSF has been established by UZH and Novartis Venture Fund with the goal to create financing possibilities for UZH spin-off companies. These ventures are often in a very early stage of development. UZH LSF aims to promote innovation in the life sciences in the Zurich area.

Skin graft (copyright Wyss Zurich)

CASE STUDY

(RE)DISCOVER ART

Problem – Challenge: Lack of perception in digitized art

How can we improve the perception of Art and at the same time better preserve our cultural heritage, using modern digital technology?
When looking at a 2D image of an artwork, the vital element of materiality, which is essential to its comprehension and appreciation, is missing.
Although for the past decade the online Art market has been booming, the lack of interaction and security standards ("what is the real condition of an artwork?") due to the use of traditional technology such as 2D images, is capping its growth.

Solution: Unique digital fingerprints

With its new generation of scanners and algorithms developed at the EPFL, ARTMYN is radically changing the visualization and preservation of art online, by recreating digital twins. Pigments, surface topography and materiality of a work are all translated, allowing the digital twin to be manipulated and inspected, from any mobile device, just like an expert would.
This technology not only allows for a better comprehension and experience of the artwork, but also makes an artwork scanned by ARTMYN unfalsifiable: a first scan will generate a unique digital fingerprint, allowing to automatically detect any potential damages or forgeries after a second scan.

4. COMMERCIALIZATION ACTIVITIES

Research results of Universities, UAS and RI do have potential to form the basis for innovative products 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 for industry of academic TT and licensing, 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 usually 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. At many institutions, the creation of such start-up companies is supported by various additional services. Sections 4.1 – 4.4 in this report describe the key TT indicators in relation to those activities from the participating institutions.

4.1 Invention Disclosures

A total number of 647 (–2%) invention disclosures were reported for 2017. The vast majority of invention disclosures were reported by Universities (91.7%). The three RI accounted for 6.8% of the invention disclosures, the UAS for 1.5%.

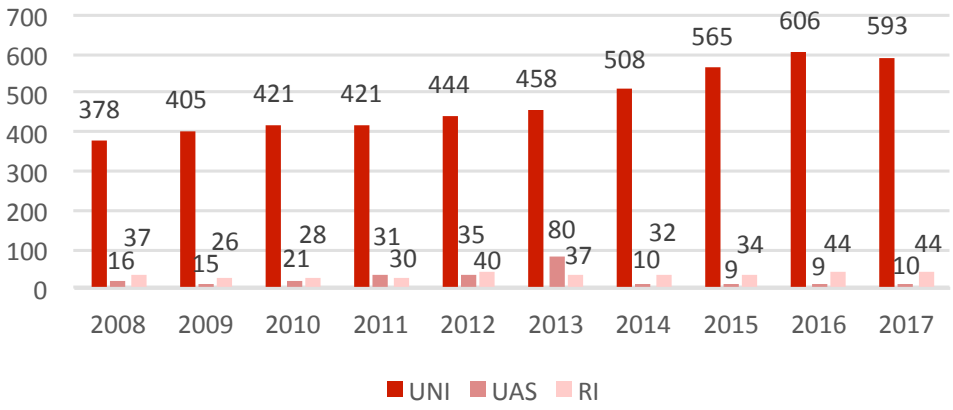


Fig. 4:
Number of Invention Disclosures

4.2 Patenting Activities

4.2.1 Priority Patent Applications

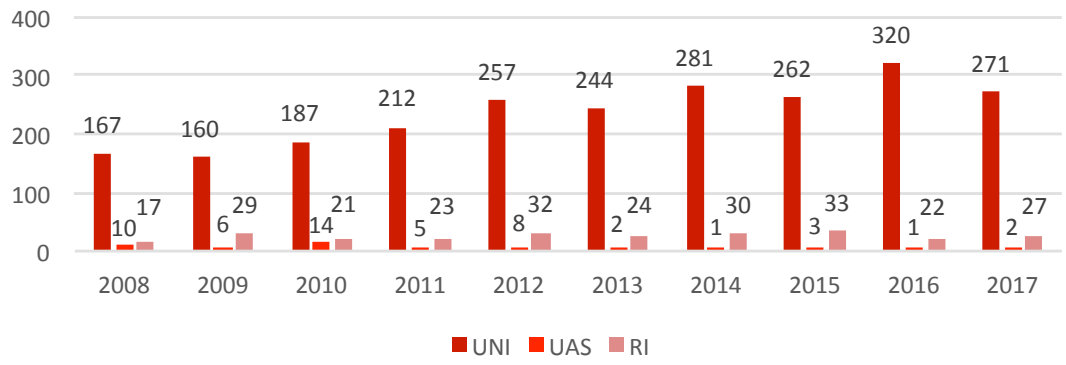
In 2017 the institutions reported 300 new priority patent applications, 13% less than in 2016. As for the previous year, the majority of these applications were filed by Universities (90.3%), followed by the RI (9.0%) and UAS (0.7%). In total 83% of all patent applications were filed by ETH Transfer, the TTO of EPFL and Unitectra (the TTO for the Universities of Basel, Bern and Zurich).

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.

4.2.2 Patent Portfolio – Active Patent Cases End of 2017

At the end of 2017, the institutions participating in the survey reported 2519 (+4.1%) 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). swiTTlist provides 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



CASE STUDY

FLOW CYTOMETRY BRINGS ANALYSIS METHOD TO FLOW

Problem – Challenge

The bacteriological quality of (drinking) water is generally still evaluated using a method that is over 100 years old, namely cultivating bacteria on plates containing a nutrient medium and counting the bacterial colonies. Despite its ubiquitous use, this method is rather time consuming. It takes approximately 3 days to detect microbiological contamination of (drinking) water. The detection of additional pathogens, such as Legionella, can easily take several days to weeks. A further disadvantage of culture methods lies in the fact that only a minor fraction of microorganisms found in environmental samples (0.1-1%) grow in culture media and can therefore be detected. Over the past ten years however, flow cytometry (FCM) has become established as a modern, rapid and more complete method of microbiological measurement – largely due to research undertaken at Eawag. Originally used in medical routine analysis, Flow Cytometry is now finding its way into the quality control of drinking water as a promising alternative to existing methods.

Solution

Thanks to automated flow cytometry, microbiological dynamics can now be tracked promptly and in detail. Instead of placing each individual sample into the flow cytometer by hand, a unit coupled to the apparatus now does everything automatically, from sampling to sample preparation by staining the DNA/RNA, through to sterilisation of the cytometer. The fully-automated measuring system may be installed directly in-situ, such as at a water source or a water treatment plant. From there it transmits temporally high-resolution data sets of the bacterial concentrations over a period of several months, sampling and transmitting tens of thousands measurements. Out of the initial research two inventions have been filed for patent. FCM has been tested in both natural and technical systems within the context of a doctoral thesis and in a regional project with the Canton Basel Landschaft. Moreover, the former Ph.D, Dr. Michael Besmer, is now CEO of onCyt Microbiology AG, a spin-off of Eawag.




CASE STUDY

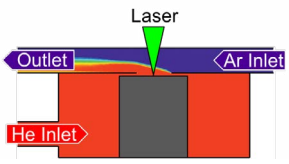
LASER ABLATION CELL FOR HIGH-RESOLUTION IMAGING MASS SPECTROMETRY

Problem – Challenge

Laser ablation cells are most commonly used for high-throughput measurements in mass spectrometry. Each laser shot produces a small volume of aerosol from a solid sample. Then, the aerosol is transported quickly to the spectrometer in order to a) clear the ablation cell for the next laser shot and b) avoid dispersion of the sample, which would result in a signal reduction. The quick transport of the ablated aerosol is challenging as turbulences in the carrier gas flow have to be avoided.

Solution

The laser ablation cell has a simple and yet very effective design (fig. 1), which is optimised for a fast washout of the sample and a laminar flow of the carrier gas. The ablation cell is attached underneath the flow tube to the spectrometer. It is flushed with helium, which rises and joins the carrier gas argon.
The concept has proven very powerful and its aspects were incorporated into the Hyperion™ Imaging System by Fluidigm® Inc., a global company which develops and markets bioanalytical instrumentation. The Hyperion system is used to study cell biology, e.g. cancer tissue. The samples are stained with a mix of metal isotope tagged antibodies. The laser evaporates the tissue spot by spot and the metal isotopes appear in the mass spectrum. Thus, the cytometry can be mapped with micrometer resolution.



Schematic of the laser ablation cell

Hyperion Imaging System by Fluidigm

4.3 Licensing

4.3.1 Licenses and Sales of Intellectual Property (IP)

Overall 215 (–14%) IP agreements, usually licenses, were reported, 92.1% of them by Universities, 7.0% by RI and 0.9 % by UAS. In a few cases the agreements involved a sale of the IP rather than a license. In total 80.5% of all agreements were handled by ETH Transfer, the TTO of EPFL and Unitectra (the TTO for the Universities of Basel, Bern and Zurich).

4.3.2 Type of Licensing Partners

As in previous years with 93 the biggest share of the licenses granted in 2017 went to SMEs (43.3%). 46 (21.4%) licenses where granted to bigger corporations and 19 (8.8%) licenses to public organizations. For 57 licenses (27.4%) the institutions didn't report the recipient of the license.

PRO regularly license technologies to their start-up companies, that are included in the SME share. 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.

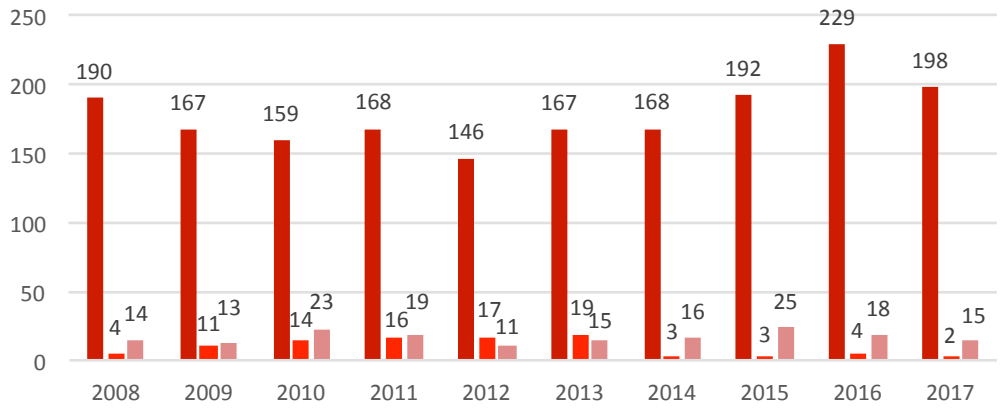
4.3.3 License Portfolio and License Income

The number of active licenses under management at the end of 2017 was reported as 1'413 (-11%) cases. Thereof, 92.92% of active licenses were handled by the Universities, 7.01% by the RI and 0.07% by the UAS.

Of these active licenses 31.9%, namely 451 cases (+11%), resulted in license income to the institutions and the researchers involved. In more than half of those cases (258) such license income came from royalties on product sales. 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. Moreover, 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.

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



Data on license income is incomplete and was reported only by about half of the institutions participating in this survey. The total license income of these institutions amounts 8.23 million CHF.

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 2017, the institutions reported equity transactions for 52 of the 72 new start-up companies created that involved a license (see Section 4.4) or a transfer of technology. In the past years more institutions started to accept equity as part of their license deals, thus reducing the annual licensing income and managing an equity portfolio.

4.4 Start-up Companies

The number of newly created start-up companies from PRO remains at a high level similar to the previous years. In 2017 the institutions reported a total of 72 new start-up companies (–3%), whereby 52 of these companies (72,2%) relied on a license or a contractual transfer of intellectual property from a PRO. The remaining companies were created on the basis of know-how developed at the research institutions, but without a formal license.

Academic institutions took equity in 36,1% of all new start-ups created in 2017 (a drop from the 41.9% in 2016).

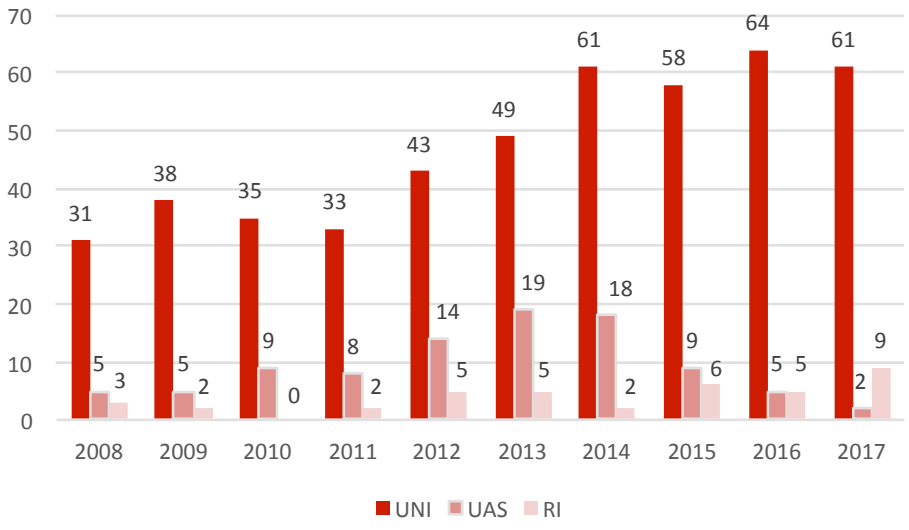


Fig. 7:
Number of Start-up Companies Founded which were Based on Licensing or Contractual Transfer of an Institution's Technology

CASE STUDY

OTOPLAN – PLANNING EAR/COCHLEA SURGERY

Problem – Challenge

A quarter of the world's population over 45 years suffers from substantial hearing loss. Such patients don't understand whisper or softly speaking (<26dB). Besides that 2-6‰ of all babies are born deaf. An electrode, by which the cochlea is stimulated by electrical impulses, can be inserted to correct these severe hearing losses. However, this cochlea operation is a highly sensitive intervention with a multitude of parameters to be considered. The planning and execution of the surgery has an enormous influence on the result in terms of hearing quality.

Solution

OTOPLAN is a revolutionary tablet-based planning software for cochlea implantation surgery. The software quickly generates patient-specific 3D reconstruction from CT images, and easily visualizes each patient's unique anatomy. This way it facilitates surgical planning, i.e. the surgeons sees exactly where they are going before they make the first cut.

It makes it easy to gain an ideal view of the cochlea and to choose the best electrode array for each patient to achieve the best hearing outcome. OTOPLAN works with patient specific data, shows insertion depths and covered frequency of each electrode contact. One-step processes exist to automatically generate case reports. Post-operative images can also be processed for quality check of the cochlea electrode insertion.

The software is based on years of work by the ENT Group of the ARTORG Department of the University of Bern and the Inselspital. The software has been licensed to CAScination AG, a spin-off company of the University of Bern, and brought to market together with MED-EL in Innsbruck.

OTOPLAN – a revolutionary ear surgery planning tool

CASE STUDY

ANTIA THERAPEUTICS – FROM A NEW POLYMER TO THE CLINICAL PRODUCT

Problem – Challenge

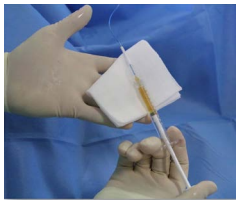
Embolization of bloods vessel is useful to control bleeding or to ablate diseased tissue by cutting off its blood supply. Endovascular embolization is used as an alternative to surgical interventions for a variety of purposes including for example the endovascular treatment of tumors or the treatment of lesions such as aneurysms.

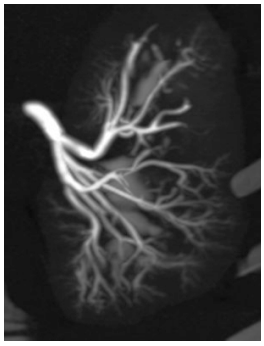
To achieve endovascular embolization, a preformed polymer in suspension is usually injected into the blood vessel via a catheter and precipitates at the contact of blood forming a plug in the blood vessel. A radio-opaque material is often included in the polymer suspension to allow radiological imaging during the embolization process and clinical follow-up. However, the currently used radio-opaque material is not directly bound to the polymer and tends to diffuse out of the embolization plug over time which reduces the ability to visualize the plug and may further generate toxicity

Solution

Antia Therapeutics has developed a novel radio-opaque polymer for minimally invasive embolization which contains a radio-opaque moiety covalently linked to the polymer, thus allowing for optimal long-term radiological follow-up. The polymer is moreover easier to prepare on site, just before injection, than currently used polymers.

Antia Therapeutics was created in 2007 as a University of Geneva and EPFL spin-off, and has sponsored research at University of Geneva and Université Claude Bernard Lyon 1 to develop the polymer and optimize its formulation. Antia has then upscaled the production process and proceeded to the preclinical studies required to obtain CE marking in 2016. The polymer was succesfully tested in humans in 2017 and has been validated for treating hypervascular malformations. Antia is now carrying out clinical studies for additional indications of its embolization product, such as for example in the neurointeventional field.





APPENDIX 1 – INSTITUTIONS CONTACTED FOR THE SURVEY AND COMMENTS ON THEIR DATA PROVIDED

Universities	TT-Office	Comments on data provided
Eidgenössische Technische Hochschule ETH Zürich	ETH transfer	Complete data, research agreements <50kCHF only partly
Ecole Polytechnique Fédéral (EPF) Lausanne	TTO	Complete data, research agreements <50kCHF 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 inclucing Adolphe Merkle Institute	Tech Transfer Fribourg	Partial data, not all contracts pass through TTO, especially SNF and EU-grants are treated separately
Université de Genève / Hôpitaux	Unitec	Complete data for commercialization activities, research contracts
Université de Genève	Universitaires de Genève	Universitaires de Genève only partly handled by TTO
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	Complete data for commercialization activities, research contracts
University of Lucerne	–	No data available
Université de Neuchâtel	TTO	Complete data
University of St. Gallen	TTO	No data available
Università della Swizzera Italiana (USI)	TTO	Partial Data; TTO only started on 1.1.2018
Universität Zürich / Universitätsspital	Unitectra	Only aggregated data, data only for the Medical, Vetsuisse and Naural Sciences Faculties, no data for research agreements of other faculties

Universities of Applied Sciences	TT-Office	Comments on data provid
Berner Fachhochschule (BFH)	TTO	Partial data from several departements (AHB,TI,WGS,HKB,HAFL)
Fachhochschule Nordwestschweiz (FHNW)	TTO	Data available from School of Life Sciences (HLS)
Fachhochschule St. Gallen	–	No data available
Fachhochschule Ostschweiz (FH OST–NTB)	TTO	Partial data only available from from NTB Interstaatliche Hochschule für Technik Buchs
Zürcher Fachhochschule ZFH	ZHAW TTO	Data only available from ‹Zürcher Hochschule für Angewandte Wissenschaften› (ZHAW)
Hochschule Luzern – Lucerne, University of Applied Sciences and Arts (HSLU)	Ressort F&E	Partial data available
Haute Ecole Spécialisée de Suisse occidentale (HES-SO)	Tech Transfer Fribourg	No data available
Scuola Universitaria Professonale della Svizzera Italiana (SUPSI)	Research & Innovation	No data available

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

APPENDIX 2 – DETAILED DATA 2008 – 2017

Institution	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Full-time equivalents (FTE)	63	68	64	74	81	86	85.7	89.2	92.4	100.9
Research contracts (incl. EU contracts)	2745	2855	3035	2872	2349	3924	3237	3297	3348	3571
Invention disclosures	431	446	470	482	519	575	550	608	659	647
Priority patent applications	194	195	224	240	297	270	312	298	343	300
Active patent cases end of the year	924	1512	1573	1606	1818	1951	1969	2191	2429	2519
License agreements	208	191	196	203	174	201	187	220	251	215
Active license agreements end of the year	1079	1143	1237	1249	1307	1351	1437	1474	1591	1413
kCHF of net licensing revenues	9479	8197	8533	7665	13303	14776	18729	10316	10615	8239
License agreements with revenues in respective	271	289	288	299	308	386	376	406	463	451
New start-ups on basis of formal license	39	45	44	43	62(29)	73(45)	81(49)	73(47)	74(53)	72(52)

Universities	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Full-time equivalents (FTE)	42	47	45	50.5	50	52.3	56.1	55.5	59.2	70.2
Research contracts (incl. EU contracts)	1885	2120	2285	2158	2348	2360	2195	2303	2465	2435
Invention disclosures	378	405	421	421	444	458	508	565	606	593
Priority patent applications	167	160	187	212	257	244	281	262	320	271
Active patent cases end of the year	779	1355	1358	1450	1664	1779	1839	2008	2202	2318
License agreements	190	167	159	168	146	167	168	192	229	198
Active license agreements end of the year	1013	1058	1135	1459	1167	1213	1320	1352	1487	1313
kCHF of net licensing revenues	8338	7686	7829	7029	10519	9713	14170	6933	6395	7969
License agreements with revenues in respective	252	268	258	257	270	337	339	203	410	429
New start-ups on basis of formal license	31	38	34	33	43(23)	49(35)	61(38)	58(41)	64(44)	61(44)

RI	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Full-time equivalents (FTE)	7	7	6	8	8	7.7	7.4	8.8	9.2	9.1
Research contracts (incl. EU contracts)	395	416	293	340	353	320	365	420	441	409
Invention disclosures	37	26	28	30	40	37	32	34	44	44
Priority patent applications	17	29	21	23	32	24	30	33	22	27
Active patent cases end of the year	97	110	141	112	112	133	121	174	186	187
License agreements	14	13	23	19	11	15	16	25	18	15
Active license agreements end of the year	61	81	90	103	123	119	115	120	110	99
kCHF of net licensing revenues	961	337	190	170	2217	4463	4532	3353	4210	2600
License agreements with revenues in respective	16	20	17	19	21	31	34	43	51	21
New start-ups on basis of formal license	3	2	0	2	5(1)	5(2)	2(1)	6(0)	5(2)	9(7)

UAS	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Full-time equivalents (FTE)	14	14	13	15.5	23	26.1	22.2	24.9	24	21.6
Research contracts (incl. EU contracts)	455	319	457	374	621	1254	677	574	442	727
Invention disclosures	16	15	21	31	35	80	10	9	9	10
Priority patent applications	10	6	16	5	8	2	1	3	1	2
Active patent cases end of the year	48	47	56	35	42	39	9	9	41	14
License agreements	4	11	14	16	17	19	3	3	4	2
Active license agreements end of the year	5	4	12	15	17	19	2	2	18	1
kCHF of net licensing revenues	180	174	514	466	567	600	27	30	30	10
License agreements with revenues in respective	3	1	13	23	17	18	3	3	1	1
New start-ups on basis of formal license	5	5	9	8	14(5)	19(8)	18(10)	9 (6)	5(2)	2(1)

Note (i): For new start-ups the numbers in parentheses refer to equity deals
Note (ii): The number of institutions that participated in the survey varies between years.

APPENDIX 3 – KEY PARAMETERS FOR INDIVIDUAL INSTITUTIONS FOR 2017

Institution	Name TTO	Start TTO	TTO FTE	Total # research contracts	# of invention disclosures	# of priority applications	# of IP agreements	# of startups
Universities								
EPFL	EPFL-TTO	1993	14.5	244	134	95	50	15
ETHZ	ETH transfer	1995	22.6	605	191	84	53	25
Uni Geneva	Unitec	1998	9	91	54	7	16	2
Uni Lausanne	PACTT	2000	8.5	210	33	9	8	3
RI								
Eawag TT	TT Office	2001	1.2	125	3	3	1	3
Empa	TT Office	2005	4	175	25	14	11	2
PSI	TT Office	1999	3.9	109	16	10	3	4
UAS								
BFH	TT Office	1999	15	262	6	2	2	1
HSLU	Ressort F&E	1998	3	n/a	n/a	n/a	0	n/a
FH OST–NTB	TT Office	2000	2.6	75	1	0	n/a	10

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

GLOSSARY

CTI	Commission für Technolog & Innovation
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 Organisations
RI	Swiss Federal Research Institutions in the ETH domain
SME	Small- and Medium-sized Enterprises (<250 employees)
SNF	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

APPENDIX 4 – THE QUESTIONNAIRE

swiTT Technology Transfer Survey 2017 (online survey)

Preliminary Notes:

- All questions refer to the calendar year 2017. Please make your statements accordingly.
- If no answer is available for certain questions, please indicate with n.a. Questions for which your office or your institution does not collect data should be left open (n.a.) and should not be answered by giving an estimate.

1. Confidentiality			
Do you agree to the publication of the individual data collected in the questions marked *[pub] under your institution name? All other data will only be published in The aggregated format by type of institution? *All other data will only be published in the aggregated format by the type of institution*			☐ Yes ☐ No
2. Background Information			
2.1 Name of the academic institution/s			
2.2 Is your institution associated with a university hospital? *(If yes, please note that all figures given below should include the numbers of the hospital, too)*			☐ Yes ☐ No
2.3 Does your institution gave a dedicated office / responsible person for TT activities (TTO)?			
If yes which year did the TT program start)		*[pub]*	
2.4 Name of the responsible for survey program			
Name of responsible for survey data			
2.5 TTO address and contact information			
Office Name :		Telephone	
Office Name :		Telephone	
Street :		e-mail	
City :		Postal code	
3. Activities and FTEs			
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) Coaching of start-up projects			☐ Yes ☐ No
(F) Financial administration of research projects			☐ Yes ☐ No
3.2 How many full time equivalents FTE were employed in your TTO on Dec. 31st 2017 *(Do NOT include researches working as project managers in transfer project in this number)*		FTE *[pub]*	
3.3 Of these FTE, how many were employed to work on			
(A) Technology transfer activities *(Staff with main occupations (> 20%) in the area of technology transfer, such as 'Licensing Officers', 'Intellectual Property Managers', Technology Managers', or 'Research Contract Officers. Do NOT include project managers carrying out transfer projects)*		FTE	
(B) Administration and general management			
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)*		FTE	
4. Research and Development			
4.1 Total number of new research contracts handled by your TTO *(Collaboration agreements, service agreements, clinical trial agreements, CTI complementary and EU agreements, NO MTA, NO NDA, or other TT contacts (see 4.3) and NO SNSF contracts)*		[pub]	
Of these research contracts, how many were executed with small and medium enterprise (SME), how many with large companies and how many with public partners? *(Definition: SME are companies with 250 or less employees)*		(A) SME: (B) Large Company: (C) Public Institutions: (D) Multiple Partners (E) Don't know *(Sum shall equal 4.1!)*	
4.2 Amount of cash payments due to your institution from research contracts that were handled by your TTO according to 4.1 *(Please give the amount of cash due to your institution, NO material asset e.g. for machinery and NOT the total amount of Research Project, 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. Do not split the amount, if the contract is covering several years but report the fill amount in the year the contract is signed)*		CHF	
4.3 Number of other technology transfer contracts handled by your TTO *(Non-Disclosure Agreements (NDA), Material Transfer Agreements (MTA), consulting contracts, inter-institutional contracts, sponsoring, donations, but NO licenses, options, sales)*			
Comments to 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 Activity	
5.1 How many invention disclosures were received by your TTO?	[pub]
5.2 How many priority applications were filed by your TTO? *(Priority application being the very first application for a new technology in any patent office of the world)*	
(A) Of these, how many are based on research significantly funded by SNSF	
5.3 What was the overall number of active patent cases at the end of 2017 managed by your TTO? *(Active patents cases are pending or granted patents on a technically unique invention (patent family). Application in various countries on ONE technically unique invention count as ONE patent case*	
6. Patenting Costs and Legal Fees	
6.1 Amounts spent by your TTO/institution on patenting costs and external legal fees? *(Including all external costs for patent filing, prosecution, maintenance, litigation, expenses or costs for drafting or support in negotiation of contracts)*	CHF
6.2 Amount of patenting costs and legal fees invoiced to commercialization partners? *(Does NOT include patenting costs or legal fees paid DIRECTLY to the patent attorney or other service providers by licensees or external partners)*	CHF
7. License, Option and Sales Agreements	
7.1 How many licenses/options/sales of protected or unprotected IP did your TTO execute? *(Count only the agreements for different technologies, i.e. 30 licenses for the same software library count as ONE. 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 NOT be included in this question unless the invention/software that is licensed/sold exists already at the execution date of the research contracts)*	[pub]
Of these licenses/options/sales, how many were licensed to SME, how many to large companies or public institutions? *(Definition: SME are companies with 250 or fewer employees)*	(A) SME: (B) Large Company: (C) Public Institutions: (D) Multiple Partners (E) Don't know *(Sum shall equal 7.1!)*
(D) Of these licenses/options/sales how many are based on research significantly Funded by SNSF?	
7.2 How many licenses/options/sales included equity? *(Equity meaning 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 How many licenses/options were active as of December 31, 2017	
Comments to 7.1 – 7.3 *(e.g. large variations to previous years, special situation, i.e. with free software licenses openBSD, etc)*	
8. License Income	
8.1 What was the total number of licenses/options/sales revenue?	
8.2 How many licenses/options/sales yielded running royalties? *(Running royalties are based on product sales and are only due after launch of a product In the market)*	
8.3 What was the total amount of licenses/options/sales revenue received at your institution? *(WITHOUT patent costs and fees invoiced in 6.2)*	CHF
9. Start-up companies	
9.1 Total number of start-up companies formed at your institution	
(A) Of these start-up companies, how many are dependent on licensing transfer of your Institution technology?	
(B) Of these start-up companies, how many are dependent on unprotected know-how or technology of your institution (without license agreement)?	
(C) Of these start-up companies, how many are based on research significantly funded by SNSF?	
9.2 In how many of these new start-up companies does your institution hold equity?	
10. Post-Licensing Activities	
10.1 Did one or more of your institution's licensed technologies become available for consumer or commercial use in 2017?	☐ Yes ☐ No
If yes, how many?	
10.2 Information about the launched products *(please give a short title of each product success story and the e-mail of the contact person for additional information)*	[Title, Contact Person]
Comments	
(if you want to bring additional comments or suggestions to the attention of the team of the swiTTreport, please post them here)	

swiTT

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 100 members from all parts of Switzerland. Most of them work in technology transfer at public research 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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swiss technology transfer association

swiTT MISSION

- COOPERATION
- 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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