swiTT
swiss technology transfer association

swiTTreport 2013

SWISS TECHNOLOGY TRANSFER REPORT

IMPRESSUM

Editor

swiTT – Swiss Technology Transfer Association
3000 Bern
switt@switt.ch
www.switt.ch

swiTTreport Committee

Herbert Reutimann, Unitectra, Universities of Basel, Bern and Zurich
Robert Rudolph, Swissmem
Domenico Alexakis, swiTT Office

CONTENTS

Supported by

FNSNF
Schweizerischer Nationalfonds
zur Förderung der wissenschaftlichen Forschung

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Confederation

Federal Department of Economic Affairs FDEA
Federal Office for Professional Education and Technology OPET
Innovation Promotion Agency CTI

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. For further information please refer to www.swiTT*list*.ch.

SWITT MISSION

COOPERATION – DEVELOPMENT – SERVICES - DIALOGUE

- Facilitates and strengthens cooperation and technology transfer between Swiss public research institutions and the private sector; (COOPERATION)
- Offers professional development to its members and other practitioners involved in technology transfer within public institutions and the private sector; (DEVELOPMENT)
- Provides services of common interest to its members, their institutions and other stakeholders involved. (SERVICES)
- Maintains an active dialogue with research institutions, the private sector and the authorities to foster optimal processes and regulatory framework / regulations. (DIALOGUE)

CASE

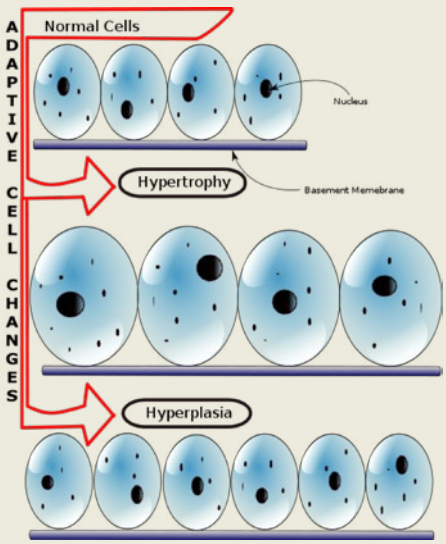
TREATMENT OF TYPE 2 DIABETES BY A NOVEL MEDICAL FOOD

ETH Zürich GLYCEMICON

Background

Type 2 diabetes and its associated consequences such as heart or kidney problems are a growing health and economic problem. New possibilities for treatment or prevention of diabetes type 2 are highly desirable.

Overweight and obesity are intimately related to diabetes as evidenced by the 80 to 85% risk of obese individuals to develop type 2 diabetes. Being overweight gradually causes the body to lose its responsiveness to insulin.



A novel Medical Food

Excess fat gradually causes the body to lose its responsiveness to insulin, the hormone that mediates efficient blood glucose uptake into cells in a healthy human being. Becoming resistant to the effect of insulin reduces the body`s ability to maintain normal blood glucose levels. Consequently, many overweight and obese people whose glucose levels appear normal are already in progress of developing pre-diabetes and subsequently type 2 diabetes.

Researchers from ETH Zurich have identified the retinoid orphan receptor gamma (RORγ) as a modulator of fat composition. Increased levels of this protein in human adipose tissue indicate a higher risk for developing insulin resistance and type 2 diabetes. In line, complete loss of RORγ in mice protects the animals from the development of insulin resistance on a high fat diet regimen. Characteristic for the fat tissue of RORγ knockout mice is the high number of small and functioning adipocytes compared to control mice that are resistant to insulin (Fig. 1).

The researchers have recntly founded the ETH spin-off Glycemicon to further develop the technology. Their aim is to promote healthy fat and normal blood glucose by suppressing the activity of RORγ - the same/natural mechanism that might be used by infants to build their fat depots. Glycemicon has licensed the technology from ETH Zurich.

www.glycemicon.com

SUMMARY

The annual survey „swiTTreport" is the most comprehensive analysis of the technology transfer activities of Swiss public research institutions. 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 public research institutions 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 seven cantonal universities and the two Federal institutes of technology (collectively Universities), from four universities of applied sciences (UAS), and three research institutions of the ETH domain (RI) were available for this years' report. However, some of the data were incomplete or fragmentary, and the figures presented in this report clearly underestimate the real situation. Data from several institutions were not available or were too fragmentary to be included in the report. In most figures, the data for 2012 are compared with the data from previous years although the institutional basis is not always the same.

The respondents reported their results to swiTT voluntarily, and the data presented in the report are on an "as-reported" basis. For reasons of confidentiality, the report mainly contains aggregated numbers. However, some of the key parameters are presented on an individual basis but only for those institutions that agreed to do so. On account of the difference in mission, organization and objectives of the three types of institution (Universities, UAS, RI), their data are reported separately.

Overall, the respondents reported the following key figures on technology transfer activities in 2012:

3323 new research projects with economic partners were initiated

519 invention disclosures were registered

297 priority patent applications were filed

174 license and option agreements were executed

62 start-up companies were created, of which 29 were based on a license or transfer of IP and 33 on know-how from the institutions

A conservative extrapolation of the partial data received shows that the institutions covered in this report overall started more than 4'000 new research projects with external business partners last year. Larger companies (>250 employees) are the most common cooperation partners of the Universities whereas the UAS most often cooperate with either public institutions or with small and medium-sized enterprises (SME). At he RI the majority of partners are public institutions.

Universities account for most of the commercialization activities reported, i.e. about 83% of all cases. Commercialization occurs most frequently with SME, including start-ups (61%). In about 25% of the cases the partner was a large company, in 13% it was another public institution.

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

RÉSUMÉ

L'enquête annuelle «swiTTreport» est l'analyse la plus complète des activités de transfert de technologies réalisées par les institutions de recherche publiques suisses. Le rapport couvre deux domaines majeurs: a) la collaboration en matière de recherche des institutions participantes avec des partenaires privés ou publics et b) les activités liées à la commercialisation des résultats de recherche obtenus par ces institutions. Les institutions de recherche publiques suisses coopèrent très activement avec des partenaires économiques dans ce que le rapport désigne collectivement sous le terme d'activités de "«transfert de technologies» (TT). S'agissant des disciplines scientifiques, l'accent est mis principalement sur les sciences de la vie, les sciences naturelles et l'ingénierie.

Le rapport de cette année s'est appuyé sur les données relatives aux activités de transfert de technologies de sept universités cantonales et deux écoles polytechniques fédérales (ci-après collectivement les «universités»), de quatre universités de sciences appliquées («UAS») et de trois institutions de recherche dans le domaine EPF («RI»). Certaines données étaient toutefois incomplètes ou fragmentaires si bien que les chiffres présentés dans ce rapport sous-estiment clairement la situation réelle. Par ailleurs, les données de plusieurs institutions n'étaient pas disponibles ou étaient trop fragmentaires pour être incluses dans le rapport. Dans la plupart des cas, les chiffres de 2012 sont comparés avec les données des années précédentes, bien que la base institutionnelle ne soit pas toujours la même.

Les personnes interrogées ont communiqué volontairement à swiTT leurs résultats qui sont présentés dans ce rapport tels que rapportés. Pour des raisons de confidentialité, le rapport contient principalement des chiffres agrégés. Certains des paramètres clés sont toutefois présentés individuellement si les institutions ont donné leur accord. Compte tenu des différences de mission, d'organisation et d'objectifs des trois types d'institutions (universités, UAS, RI), leurs données sont présentées séparément.

Dans l'ensemble, les personnes interrogées ont communiqué les chiffres clés suivants sur les activités de transfert de technologies en 2012:

3323 nouveaux projets de recherche ont été lancés avec des partenaires économiques

519 annonces d'inventions ont été enregistrées

297 demandes de brevet prioritaires ont été déposées

174 contrats de licence et d'option ont été exécutés

62 start-up ont été créées dont 29 étaient fondées sur une licence ou un transfert de PI et 33 sur le savoir-faire des institutions

D'après une extrapolation conservatrice des données partielles reçues, les institutions couvertes dans ce rapport ont dans l'ensemble démarré plus de 4000 nouveaux projets de recherche avec des partenaires d'affaires externes l'an dernier. Les sociétés de taille plus grande (>250 employés) sont les partenaires de coopération les plus communs des universités, tandis que les UAS coopèrent plus souvent avec des petites et moyennes entreprises (PME). Dans le cas des RI, la majorité des partenaires sont des institutions publiques.

Les universités sont responsables de la plupart des activités de commercialisation rapportées, à savoir environ 83 %. Dans 61 % des cas, leur partenaire était une PME ou une spin-off, dans environ 25 % des cas, une grande société et dans 13 % des cas, une autre institution publique.

D'innombrables études internationales confirment la culture de collaboration entre les milieux universitaires et économiques en Suisse et l'excellente performance des universités et autres institutions de recherche publiques suisses dans le domaine du transfert de technologies. La facilité d'accès aux chercheurs universitaires et l'existence de processus clairement définis en matière de transfert de technologies constituent des critères importants pour les entreprises envisageant de déménager leurs activités en Suisse. A cet égard, le maintien d'un système fondé sur un partenariat équitable entre les milieux universitaires et économiques, ainsi que l'optimisation continue des processus seront des aspects essentiels pour renforcer davantage la position de leader de la Suisse à l'échelle internationale.

ZUSAMMENFASSUNG

Der jährlich publizierte "swiTTreport" ist die umfassendste Analyse der Aktivitäten der öffentlichen Forschungsinstitutionen (PRO) in der Schweiz in den Bereichen Zusammenarbeit mit der Wirtschaft und wirtschaftliche Umsetzung von Forschungsresultaten. 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 sieben kantonalen Universitäten und der beiden ETH's (zusammengefasst unter "Universitäten"), von vier Fachhochschulen („UAS") und von drei Forschungsinstitutionen 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. Einige Kennzahlen werden jedoch zum ersten Mal auf individueller Basis publiziert, allerdings nur für jene Institutionen, die einer solchen Publikation zugestimmt haben. 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 2012:

3323 neue Forschungsprojekte mit Wirtschaftspartnern gestartet

519 Erfindungsmeldungen registriert

297 Prioritäts-Patentanmeldungen eingereicht

174 Lizenz- und Optionsverträge bzw. IP-Verkäufe abgeschlossen

62 Start-up Firmen wurden gegründet, 29 davon auf Basis einer Nutzungsvereinbarung für geistiges Eigentum mit der entsprechenden Institution und 33 basierend auf Know-how

Da die Daten verschiedener Institutionen unvollständig sind, kann bei einer konservativen Extrapolation davon ausgegangen werden, dass an den teilnehmenden Institutionen 2012 über 4000 neue Projekte mit Wirtschaftspartnern gestartet wurden. Grosse Firmen (>250 Mitarbeiter) sind die häufigsten Kooperationspartner der Universitäten. Die UAS arbeiten am häufigsten mit KMU zusammen und die RI mit anderen öffentlichen Institutionen.

Die Universitäten sind für meisten Aktivitäten im Bereich der wirtschaftlichen Umsetzung von Forschungsergebnissen verantwortlich (83 %). Bei den Partnern in diesem Bereich handelt es sich mehrheitlich um KMU, inkl. Start-ups (61 %). In 25 % der Fälle waren es grössere Firmen und in 13 % Institutionen aus dem öffentlichen Bereich.

Diverse internationale Untersuchungen bestätigen die kooperative Kultur zwischen Industrie und Hochschulen in der Schweiz und die ausgezeichneten Transferleistungen der öffentlichen Forschungsinstitutionen. Der einfache Zugang zu akademischer Forschung und gut etablierte Transferprozesse 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 der Schweiz in diesem Bereich auch künftig beibehalten zu können.

1. INSTITUTIONS PARTICIPATING AND DATA COLLECTION

Nine universities and the two Swiss Federal Institutes of Technology (collectively 'Universities'), seven Universities of Applied Sciences (UAS), and three research institutes (RI) in the ETH domain were contacted in spring of 2013 and asked to provide data on their technology transfer (TT) activities for the year 2012. 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 Universities, individual departments of five UAS, and by three RI. However, the handling of research collaborations with economic partners and other technology transfer activities varies a lot among different institutions, and not all of them were able to provide comprehensive data in this field. **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 considerably higher.** Table 1 on the next page shows the institutions that participated in the survey and comments on the comprehensiveness of the data provided.

Comments on data received by the different types of institutions:

Universities: At several Universities, contracts for collaborative research projects with economic partners need only to be signed by university management above a certain amount. Therefore, not all small projects were reported by such institutions. At some Universities, technology transfer offices (TTO) only handle a small part of the collaborative research projects with economic partners; and at some Universities, centralized TTO were created only recently. Activities in research and technology transfer 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. With several hospitals, especially clinical research activities are not included.

UAS: The management of technology transfer activities at the UAS varies widely. Some departments or schools have professionals working in centralized TTO (e.g. BFH and ZHAW) and are able to provide comprehensive data. At other departments or schools, no centralized support functions exist and data are fragmentary or are completely lacking.

RI: The research institutions that participated in the survey have centralized support functions providing technology transfer services for the researchers although the scope of services provided differ.

swiTTreport represents the most comprehensive study in Switzerland on technology transfer activities of academic and other public research institutions. 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 on page 23.

Table 1: Institutions contacted for the survey and comments on their data provided.

Institution	Technology Transfer Office (TTO)	Comments on data provided
Universities	**(Total 11)**	
ETH Zürich	ETH transfer	Complete data, research agreements <50kCHF only partly
EPF Lausanne	TTO	Complete data, research agreements <50kCHF only partly
Universität Basel / Universitätsspital Basel	Unitectra	Complete data only for the Medical, Natural Sciences and Psychology Faculties, partial data for hospital
Universität Bern / Inselspital	Unitectra	Complete data only for the Medical, Vetsuisse and Nat.Science Faculties, no data for research agreements of other faculties
University of Fribourg	TTO	Partial data available
Université de Genève / Hôpitaux Universitaires de Genève	Unitec	Complete data for commercialization activities, research contracts only partly handled by TTO
Université de Lausanne / Centre Hospitalier Universitaire Vaudois Lausanne	PACTT	Complete data for commercialization activities, research contracts only partly handled by TTO
Université de Neuchâtel	TTO	Fragmentary data, research contracts only partly handled by TTO
University of St. Gallen	TTO	No data available
Università della Svizzera italiana	TicinoTransfer	No data available
Universität Zürich / Universitätsspital	Unitectra	Complete data only for the Medical, Vetsuisse and Nat.Sciences Faculties, no data for research agreements of other faculties
Universities of Applied Siences	**(Total 7)**	
Berner Fachhochschule	TTO	Complete Data (AHB,TI,WGS,HKB,HAFL)
Fachhochschule Nordwestschweiz (FHNW)	TTO	Data available from the department 'Life Sciences', no data available for the department 'Technik'
Fachhochschule Ostschweiz	TTO	Partial data available
Zürcher Fachhochschule	ZHAW TTO	Data only available from 'Zürcher Hochschule für Angewandte Wissenschaften' (ZHAW)
Hochschule Luzern	ITZ - Innovations Transfer Zentralschweiz	No data available
Haute Ecole Spécialisée de Suisse occidentale (HES-SO)	TTO	No data available
Scuola Universitaria Professonale della Svizzera Italiana (SUPSI)	Ticino Transfer	No data available
Research Institutes	**(Total 3)**	
Paul Scherrer Institut	PSI TT - Office	Complete data on research projects, partial data on IP
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	Partial data available

2. INSTITUTIONAL RESOURCES FOR TECHNOLOGY TRANSFER

2.1 Services Provided

All TTO at the Universities are handling contracts for research collaborations. However, at several Universities, the finalization of research agreements by the central office is only voluntary. All TTO deal with the management and commercialization of intellectual property (IP), which includes the evaluation of the economic value of research results, the protection and management of IP, and the licensing or sale of IP to industrial partners. Seven of nine TTO at Universities also provided support for the coaching of start-up projects and at two Universities such support is available through an incubator associated with the institution. At a few Universities TT programs still are very small and focus on few services.

The participating UAS and RI all offer support in research collaborations. Five UAS are dealing with IP management and commercialization. However, this does not apply to all individual departments or schools of the UAS. Two RI support the management and commercialization of IP. Coaching of start-up projects is offered by four UAS and one RI.

2.2 Staffing

Staffing refers to the number of full-time equivalents (FTE) employed for TT activities at an institution. These are people such as Licensing Officers, Intellectual Property Managers, Technology Managers or Research Contract Officers, 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, licensing and other commercialization activities, and the coaching of start-up projects. TT activities must account for at least 20% in this person's job description.

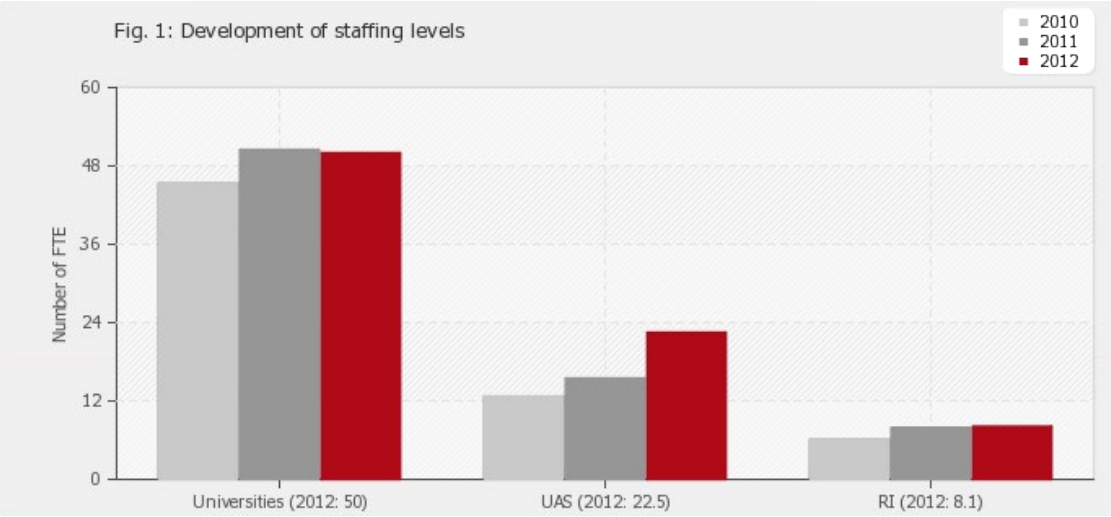


Fig. 1: Development of staffing levels.

The total number of FTE in technology transfer at the participating institutions was 80 compared to 74 in the previous year. The largest TTO had 14 FTE. The average size of the offices that responded is 4.3 FTE. Swiss TTO thus remain small in comparison to TTO in other countries if the size is normalized to the number of researchers. On the other hand, the Swiss TT professionals are on average better educated and possess more working experience in industry.

TTO usually collaborate with external patent attorneys in the drafting and filing of patent applications. Several TTO also outsource legal issues to external attorneys. At some institutions, start-up projects are handled by dedicated organizations such as a business incubators. Thus, the actual number of people supporting the transfer activities is larger than the number of FTE reported for the TTO.

3. RESEARCH COLLABORATIONS WITH PARTNERS FROM THE ECONOMY

3.1 Research Agreements Handled by the TTO

In 2012, the TTO handled contracts for a total number of 3323 research projects with economic partners. This number is higher than the number reported for the previous year (+15.7%). However, in view of the incomplete data provided by the institutions the comparison of such figures remains difficult.

For the Universities the number of new co-operative research projects increased slightly to 2349 (+8.85%). The RI reported 353 (+ 3.8%) projects the participating UAS 621. A high percentage of UAS institutions have no central data available about their TT activities or at least are not willing to share the data. Therefore, the figure cannot be compared easily with previous years. The lack of data results in a significant underestimation of the real situation. The true number of collaborative research projects is a lot higher than reported here.

Research collaborations between academia and industry are a key aspect of TT, offering a multitude of potential benefits to both parties. They not only allow industry to access the know-how and infrastructure of academia, companies also gain access to young academic talents through such collaborations. At the same time, the academic partner can often take advantage of the know-how of the industrial partners. In addition, the funding of joint projects by industry and partners from the economy accounts for a significant part of the research budgets of public research institutions. In that perspective, research collaborations are the dominant and most attractive method of TT.

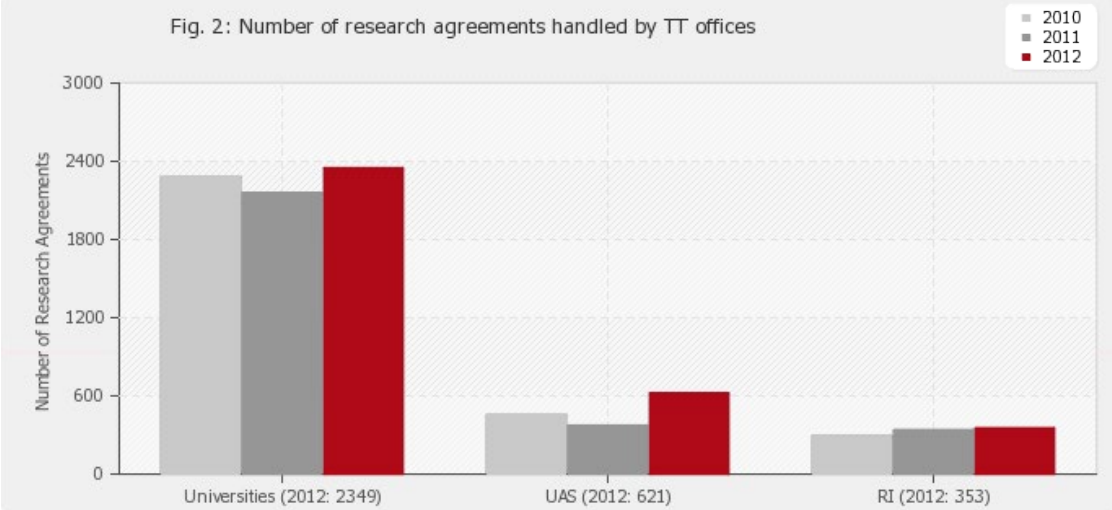


Fig. 2: Development of number of research agreements and EU contracts handled by the people responsible for TT.

For the collaborative research projects handled by the TTO, survey respondents reported total cash contributions from collaboration partners in 2012 of 392 mio CHF. The average cash payment per project is 120,000 CHF. The contribution per project at Universities and RI was about twice as high as for the projects at the UAS.

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 2012, the institutions reported altogether 2263 such other types of TT agreements.

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 26% of total projects reported. A higher number (35%) of projects were performed with large companies, and 39% with public institutions. If one considers only collaborative projects with the private sector SME account for more than one third of all projects (43%).

Both RI and UAS collaborate more often with other public institutions and SME's but in many cases the partner was not specified.

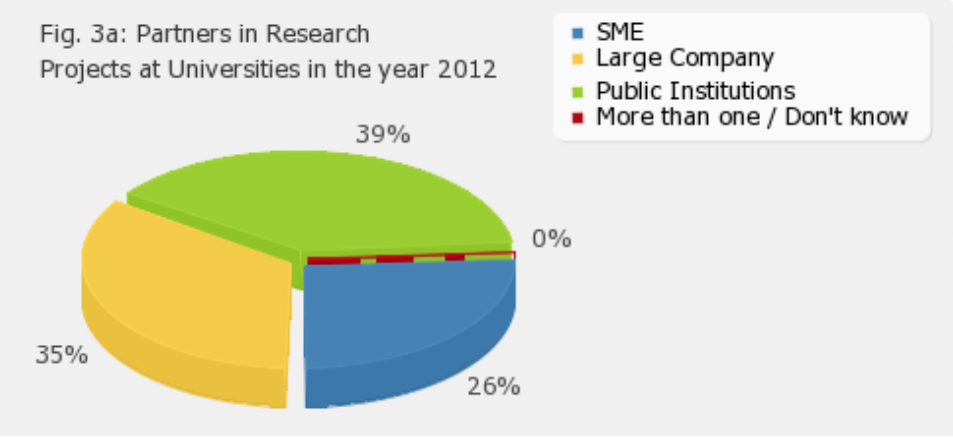


Fig. 3a: Partners in Research Projects at Universities

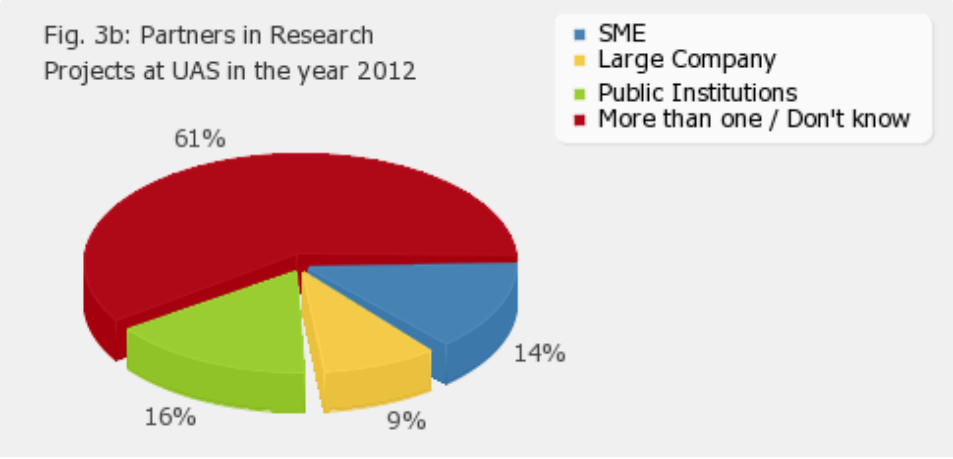


Fig. 3b: Partners in Research Projects at UAS

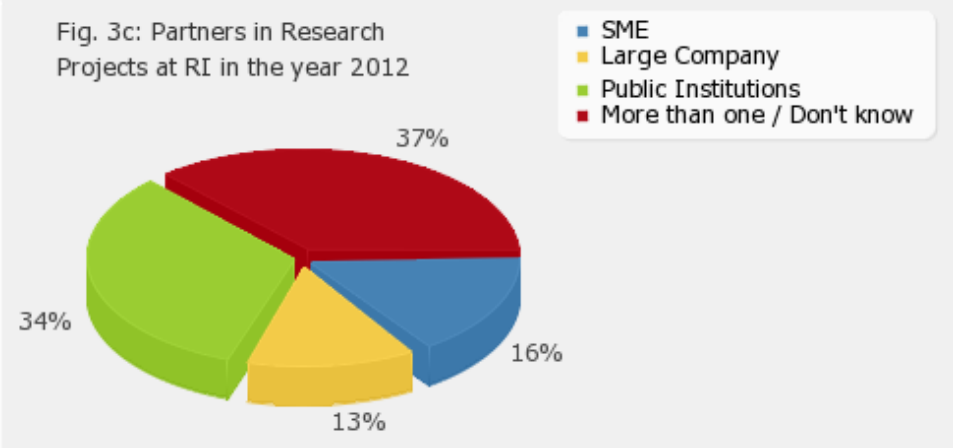


Fig. 3c: Partners in Research Projects at RI

4. COMMERCIALIZATION ACTIVITIES

Research results of Universities, UAS and RI often form the basis for innovative products which are developed and later commercialised by companies based on the work performed at public research institutions. The public institutions strive to make available research results with an economic potential to the private sector. Most frequently this is done through licensing of technologies to companies. Relevant research results need to be identified, screened and where applicable protected by patents or other suitable measures. Without a good protection of the intellectual property industrial or financial investors in many industrial sectors will not consider investing.

This whole process involves the following main steps: identification and evaluation of research results through invention disclosures, filing of patent applications, negotiating 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. In Sections 4.1 - 4.4., the main activities of the institutions participating in this report are described.

CASE

FIRST REAL TIME-BIOLUMICORDER TO MEASURE LONG-TERM GENE EXPRESSION IN FREELY MOVING RODENTS.

LESA TECHNOLOGY

UNIVERSITÉ DE GENÈVE

Problem – Challenge

Virtually all mammalian physiological function regularly fluctuate during the day. This fluctuation is orchestrated by a central clock located in the brain and local oscillators named clock genes, which are present in all organs. Clock genes are transiently expressed during the day, conferring circadian rhythms within individual cells throughout the organisms. The disruptions of circadian rhythms contribute to numerous pathologies including metabolic and cardiovascular disorders, cancer and aging, which have lead many research laboratories to investigate the mechanism of clock genes expression.

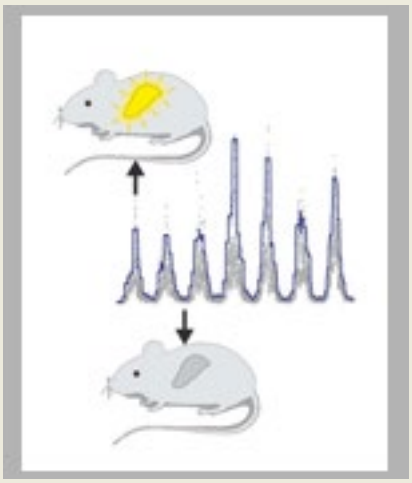
The circadian rhythms are usually studied by detection of bioluminescence emitted by luciferase, a reporter gene fused to clock genes. However, due to the lack of appropriate in vivo bioluminescence recording technologies, studies on circadian rhythms have been mainly restricted to in vitro experiments using mammalian cell lines.

Solution

The Real Time Biolumicorder has been developed to monitor and analyze rhythmic clock gene expression in live. The machine was designed to record the bioluminescence emitted by a target cell population that has been genetically engineered to express a luciferase reporter gene in organs of freely moving mice over many consecutive days. The RT-Biolumicorder consists of a cylindrical cage equipped with a PMT, a feeding machine, a water flask and a photon-reflecting walls. The RT-Biolumicorder has proven to be a useful tool to study circadian rhythms but will also find wide and fruitful applications in other areas of biomedical research such as revealing the kinetics of signaling by hormones, cytokines, metabolites and medical drugs.

The University of Geneva has patented the machine and granted an exclusive license to LESA-Technology SA to manufacture and sell The RT-Biolumicorder

The measurement of biolumimescence in real time allows tracking the expression of clock genes in mouse liver.



The RT-Biolumicorder

4.1 Invention Disclosures

A total number of 519 invention disclosures were reported for 2012 which is slightly more than in the previous year. The vast majority of invention disclosures were reported by Universities (85.5%). The three RI accounted for 7.7% of the invention disclosures, the UAS for 6.7%. Many UAS do not have a formal process for the protection of the research results. In addition, UAS often transfer the rights to research results created in the scope of collaborations to the industrial partner.

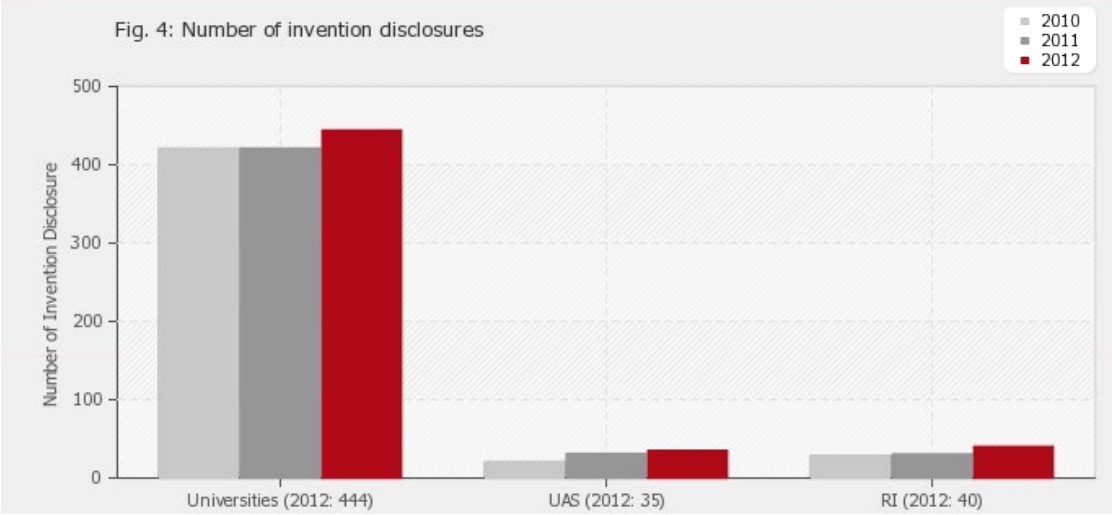


Fig. 4: Number of invention disclosures.

CASE

TRANSPARENT AND COLORFUL PHOTOVOLTAIC PANELS

SOLARONIX

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Challenge

Conventional photovoltaic panels are typically made from highly purified silicon, and require expensive equipment for their fabrication. New generation photovoltaic technologies aim at simple manufacturing methods while reducing the use of expensive materials. Groundbreaking advances in the field were brought by Professor Graetzel et al. at EPFL in the early 1990s. Their work unveiled a new and easier way to assemble solar cells, using fewer and less expensive materials. Those promising results were obtained on hand-made laboratory solar cells of a few square millimeters, leaving much work to translate the scientific discovery into an industrial product. The feasibility of such photovoltaic devices at a larger scale needed to be proven, and their long term stability needed to be guaranteed before they could enter the market.

Solution

In the mid-1990s Solaronix acquired a technology license from EPFL for Professor Graetzel's Dye Solar Cell (DSC) work and began the tasks of rationalizing and upscaling the production of the specific materials used in DSCs. These products are now distributed worldwide to other public and private research institutions. In addition the stability of the dye solar cells was intensively investigated using solar simulators produced by Solaronix. Test cells and modules have successfully endured thousands of hours of continuous illumination, and the technology has been deemed mature enough graduate to the industrial level. Meanwhile Solaronix has developed its own DSC photovoltaic panels at the square meter scale. The panels are produced in different colors and transparencies, a unique feature that allows for a variety of atypical applications. Now nearly 20 years of intense efforts have culminated in the production of a 300 square meter transparent and multicolored façade for EPFL's new congress centre, the Swiss Tech Convention Center, the world's first large scale public DSC installation.


© Alain Herzog, EPFL

4.2 Patenting Activities

4.2.1 Priority Patent Applications

In 2012 the institutions reported 297 new priority patent applications. The majority of these applications were again filed by Universities (86.5 %), followed by the RI (10.8 %) and the UAS (2.7 %). In total more than 75 % of all patent applications were filed by the three TTO's; ETH Transfer, the TTO of EPFL and by Unitectra.

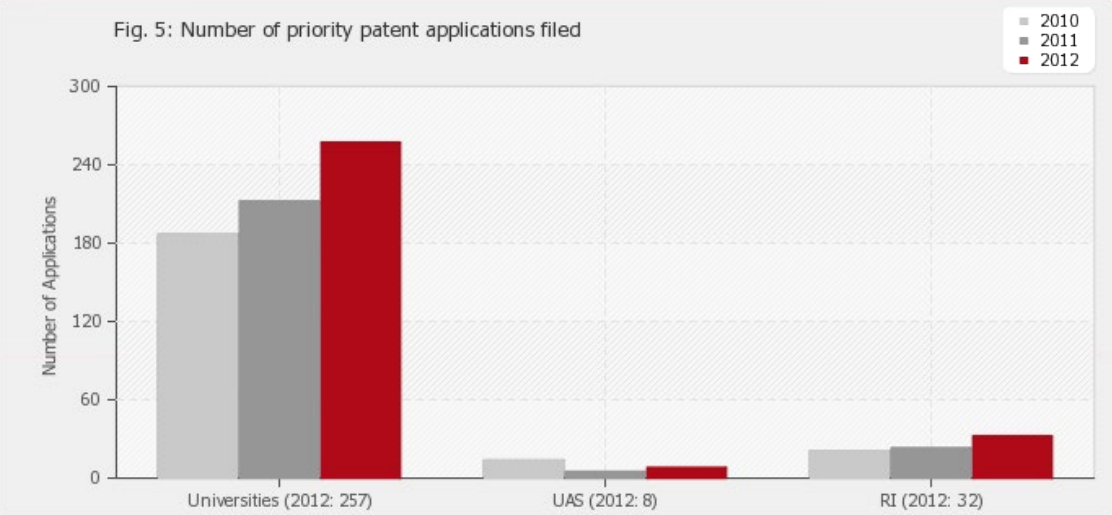


Fig. 5: Number of priority patent applications filed.

ENERGY EFFICIENCY & RENEWABLE ENERGIES IN THE BUILDING SECTOR

Problem – Challenge

The Alpine Space represents an attractive space for living, working and recreation in Europe. However, due to its geographic and economic framework, certain disadvantages occur in comparison to other European regions.

At high elevations, the climate becomes colder as a result of the angle the sun heats the surface of the Earth. This is of importance for building, since the annual energy consumption of a building is influenced by the external climate.

In alpine valleys, SMEs in the building sector are great employers. New developments and changes concerning building techniques of energy saving and producing buildings require cross-sectoral networks and collaborations of SMEs. Because of the increasing complexity in this field there is the need for customers, especially public builders, to have a better basis for decision-making.

Solution

Several energy saving buildings were analysed and energy standards compared. Furthermore, chances for local energy production were evaluated, innovative pilot projects supported, and knowledge transfer facilitated. The «ENERBUILD Tool» was developed, evaluated and pilot-tested on 46 energy efficient public buildings. The spectrum of the comparative results shows interesting correspondences between buildings and countries/ regions. Key factors identified by the transnational consortium relate to vocational training, to additional research on user behaviour, to role models in public construction, to financing of energy-producing plants on buildings, and to the placement of sample planning processes around energy-efficient building..

CASE

The protection of intellectual property in the form of patents is of great importance in many industrial sectors. This is particularly true for industries with high product development costs and long product life-cycles, e.g. biotech and pharma. The TTO at public research institutions must decide at an early stage about filing patent applications because patenting of an invention is no longer possible after the results have been published in scientific journals or through other channels.

Moreover, many companies will not consider evaluating a new techology if it is not protected by a patent. Thus, patenting activities of public research institutions can be a prerequisite for entering into a partnership with an industrial partner.

4.2.2 Patent Portfolio - Active Patent Cases End of 2012

At the end of 2012, the institutions participating in the survey reported more than 1800 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 research institutions through various channels. The existing contacts of researchers are often used to approach companies. To support the research institutions in this promotion and to provide a quick and easy overview of current technology opportunities for industry, the association swiTT established the national portal ***swiTTlist (www.swittlist.ch)***. Through their TTO, the Swiss public research institutions list technologies on this portal which have an economic potential and which are available for licensing and development by industry. 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.

CASE

BUILDING REACTIVE APPLICATIONS WITH THE TYPESAFE PLATFORM – NEW PRODUCT

ÉCOLE POLYTECHNIQUE FÉDÉRALE DE LAUSANNE

Typesafe

Challenge

Application requirements have changed dramatically in recent years. Only a few years ago a large application had tens of servers, seconds of response time, hours of offline maintenance and gigabytes of data. Consequently, solutions emphasized managed servers and containers. Scaling was achieved through buying larger servers to handle concurrent processing via multi-threading, resulting in expensive, complex, and inefficient applications.

Today applications are deployed on everything from mobile devices to cloud-based clusters running thousands of multicore processors. Data needs are expanding into the petabytes and users are expecting millisecond response and 100 percent uptime.

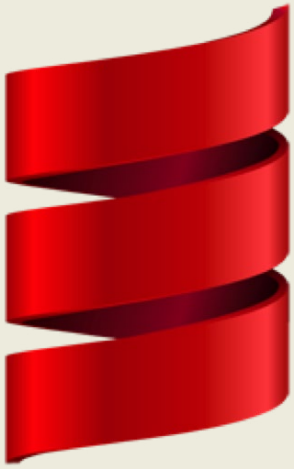
These new requirements demand new technologies and a different architecture entirely.

Solution

Typesafe helps developers conceptualize and build applications that satisfy today's demands using the Typesafe Reactive Platform. This new architecture has evolved to allow developers to deliver highly interactive user experiences with a real-time feel, backed by a scalable and resilient application stack, ready to be deployed on multicore and cloud computing architectures.

The platform features Scala, an open source programming language developed at EPFL for building reactive applications. Blending "scalable" and "language," Scala is gaining tremendous traction, growing from the 60th in 2006 to 30th most popular language in use today. Typesafe pairs Scala with Akka, an industrial-strength implementation of the Actor concurrency model, and Play, a framework that provides predictable and minimal resource consumption (CPU, memory, threads) for highly scalable applications.

Innovative internet-driven companies plus finance and telecommunication organizations were the first to adopt the Typesafe Reactive Platform and others have quickly followed.



4.3 Licensing

4.3.1 Licenses and Sales of Intellectual Property (IP)

The number of reported IP agreements, usually licenses, was slightly lower than in the previous year. Overall 174 deals were reported, 83.9 % of them by Universities, 6.3 % by RI and 9.8 % by UAS. in a few cases the agreements involved a sale of the IP rather than a license. In total 74 % of all agreements were handled by three TTO's; EPFL, ETHZ and Unitectra.

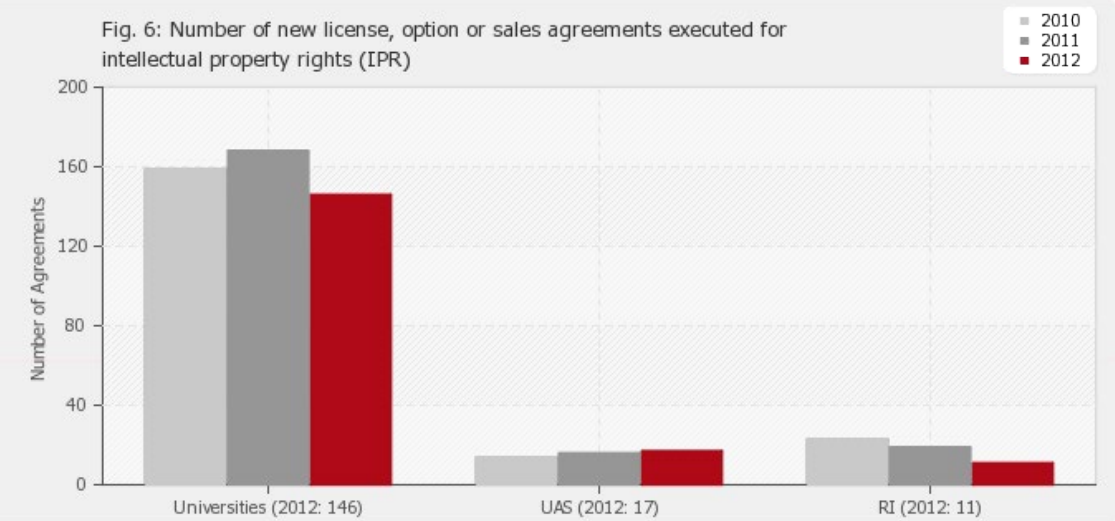


Fig. 6: Number of new license, option or sales agreements executed for intellectual property rights (IPR).

UEPAA! CASE STUDY

ETH Eidgenössische Technische Hochschule Zürich Swiss Federal Institute of Technology Zurich

uepaa! SWISS ALPINE TECHNOLOGY

CASE

Problem – Challenge

Mountaineering is extremely popular in Switzerland but cell phone coverage in remote, mountainous areas is limited and it is neither logistically feasible nor economically reasonable to expand cell phone coverage into those regions.

This represents a hazard to mountaineers who cannot call for help if an accident occurs in such a remote area.

At the same time, paths of different mountaineers cross frequently. Needed is a technology that exploits this "meet and greet" activity among mountaineers to create a secure communications system which can enhance safety.

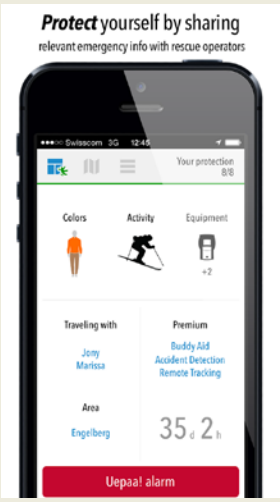
Solution

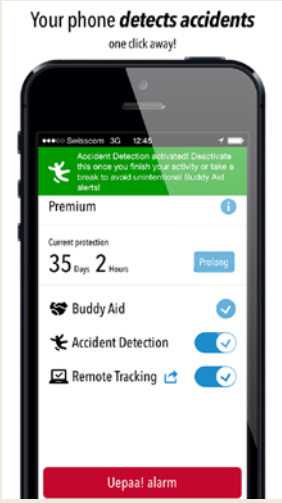
The Computer Engineering and Networks Laboratory of ETH Zurich has a long history of research on the creation of ad hoc networks among cell phones or similar devices.

This technology was picked up and developed further by Uepaa – and earlier this summer they launched the first search and rescue app that works without mobile network coverage onto the market.

The App is available for download from the Apple App Store or Google Play Store.

Uepaa!'s partners currently include Rega, Mammut, Bergportal and Swisscom.





The Application automatically recognizes accidents and can alert for help from fellow mountaineers who have the app installed. The App is distributed under a "Freemium" model, with some Premium services available on In-App purchase.

4.3.2 Type of Licensing Partners

As in previous years the majority of the licenses granted in 2012 went to SME (56%). This is mainly due to two reasons. On one hand, SME are often more interested in and more flexible to in-licensing and developing technologies from academia. Large companies have their own R&D programs and will only in-license technologies which will complement their existing portfolio.

On the other hand, public research institutions regularly license technologies to their start-up companies. 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.

4.3.3 License Portfolio and License Income

The number of active licenses under management at the end of 2012 was reported as 1307 cases, slightly higher than the previous year. Thereof, 89.3% of active licenses were handled by the Universities, 9.4% by the RI and 1.3% by the UAS.

Of these active licenses 308 cases resulted in license income to the institutions and the researchers involved. In 180 cases such license income came from 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 public research institutions. 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 public research institutions. 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, due to the early stage, the development risk is often high, and a significant number of projects are stopped before a marketable product is ready. Further, the figures are also typical for a still rather young license portfolio because many of the Swiss TTO have only been in operation for a relatively short period of time.

Data on license income are incomplete and were reported only by about half of the institutions participating in this survey. The total license income of these institutions amounted to 13.3 mio CHF more than 70% higher than in the previous year.

Mainly when licensing to start-up companies, some institutions may accept equity in such companies as

CASE

SUCTION AND IRRIGATION WITH A SINGLE HANDPIECE

INSELSPITAL UNIVERSITÄTSSPITAL BERN HOPITAL UNIVERSITAIRE DE BERNE

UNIVERSITÄT BERN

Spiegelberg: Technology for brains

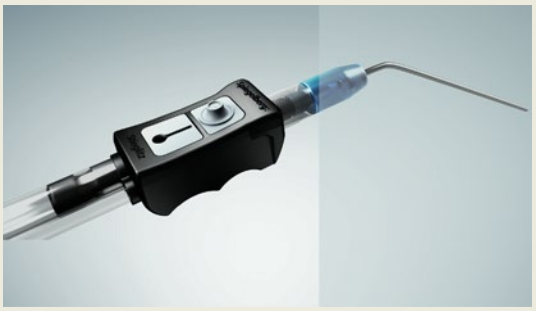
Problem-Challenge

Suction and irrigation are part of any microsurgical procedure from the very beginning to the end. Irrigation is mostly performed by an additional member of the operating room team. However, this approach requires additional personnel and more importantly the second instrument interferes with the surgeons view. In addition, this practice requires constant instructions to be given by the surgeon, which has the disadvantage of being not only time consuming but also has a negative effect on concentration and precision.

Solution

PD Dr. Stieglitz from the Neurosurgery Department of the Inselspital Bern and Spiegelberg AG, Hamburg have developed the Stieglitz-Suction and Irrigation Device. This device combines both functions in a unique way – in a single small and disposable microsurgical instrument. The special ergonomic design allows intuitive and secure handling.

The ergonomic design of the Stieglitz-Suction and Irrigation Device accommodates multiple grip positions. A keyhole-shaped opening enables the suction strength to be regulated. Irrigation and suction are carried out through an attached tube. With a small movement of the finger from the key-hole opening to an easily operable push button, the surgeon can change the function from suction to irrigation.



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 through license fee payments at the early stage of development. For the institutions, 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 2012, the institutions reported equity transactions for 6 of the 29 new start-up companies created that involved a license (see Section 4.4). In the past years more institutions started to accept equity as part of their license deals.

4.4 Start-up Companies

The number of newly created start-up companies from public research institutions remains at a high level. In 2012 the institutions reported a total of 62 new start-up companies, whereby 29 of these companies relied on a license or a contractual transfer of intellectual property from a public research institution. The remaining 33 companies were created on the basis of know-how developed at the research institutions, but without a formal license.

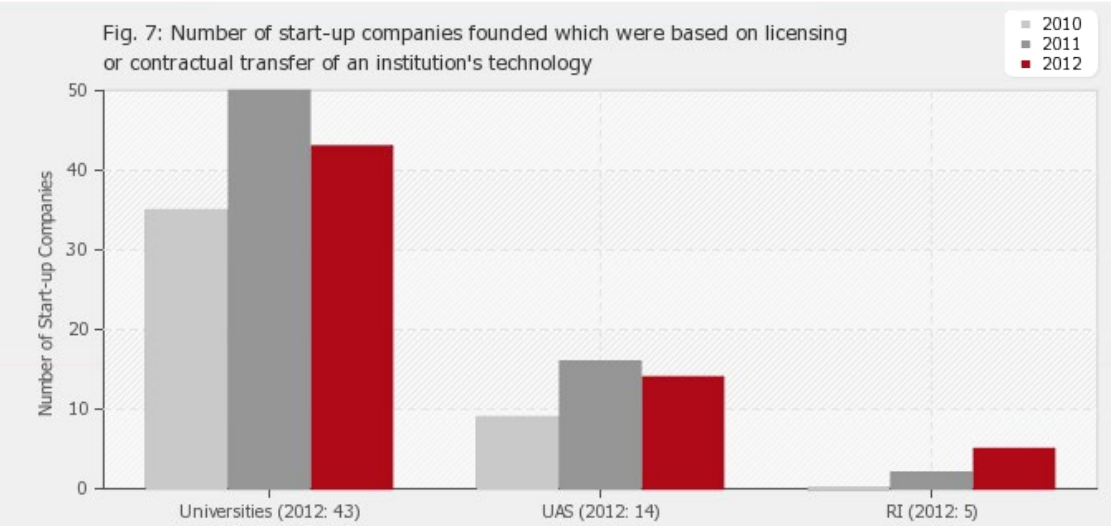


Fig. 7: Number of start-up companies founded which were based on licensing or contractual transfer of an institution's technology.

CASE

ULTRASOUND REAL-TIME MEASUREMENT OF ARTERIA CAROTIS WALL THICKNESS

Problem – Challenge

Cardiovascular disease is the main cause of death in the developed world and therefore reliable prediction of its risk while the disease is in its early stages and the patient is still asymptomatic, is important for efficient prevention.

Sonography of carotid arteries is an important method to determine the carotid stiffness and the prediction of cardiovascular events.

Fukuda Denshi has been developing highly innovative and user-friendly ultrasonic devices and its on-going development process provides systems and methods to get precise and reproducible results with the minimum of effort scanning.

.

Solution

As part of a new small size and light weight portable ultrasound system UF-760AG, Fukuda Denshi has introduced into the market the first of its kind real-time automatic IMT (intima-media thickness) measurement package named EzIMT.

This software has been programmed and tested in a cohort at the Institute of Exercise and Health Sciences of the University of Basel by the group of Prof. Arno Schmidt-Trucksäss. Its easy usage and the possibility to access EzIMT either directly during routine examination or later as part of the off-line patient data analysis makes EzIMT an ideal tool for the prediction and diagnosis of cardiovascular risks related to carotid arteries.

APPENDIX 1 – DETAILED DATA 2008-2012

Note: The number of institutions that participated in the survey varies between years.

All respondents	2009	2010	2011	2012
Full-time equivalents (FTE)	68	64	74	81
Research contracts (incl. EU contracts)	2855	3035	2872	3323
Invention disclosures	446	470	482	519
Priority patent applications	195	224	240	297
Active patent cases end of the year	1512	1573	1606	1818
License agreements	191	196	203	174
Active license agreements end of the year	1143	1237	1249	1307
kCHF of net licensing revenues	8197	8533	7665	13303
License agreements with revenues in respective year	289	288	299	308
New start-ups (on basis of formal license)	45	44	43	62 (29)

Universities	2009	2010	2011	2012
Full-time equivalents (FTE)	47	45	50.5	50
Research contracts (incl. EU contracts)	2120	2285	2158	2349
Invention disclosures	405	421	421	444
Priority patent applications	160	187	212	257
Active patent cases end of the year	1355	1356	1459	1664
License agreements	167	159	168	146
Active license agreements end of the year	1058	1135	1131	1167
kCHF of net licensing revenues	7686	7829	7029	10519
License agreements with revenues in respective year	268	258	257	270
New start-ups (on basis of formal license)	38	34	33	43 (23)

RI	2009	2010	2011	2012
Full-time equivalents (FTE)	7	6	8	8
Research contracts (incl. EU contracts)	416	293	340	353
Invention disclosures	26	28	30	40
Priority patent applications	29	21	23	32
Active patent cases end of the year	110	141	112	112
License agreements	13	23	19	11
Active license agreements end of the year	81	90	103	123
kCHF of net licensing revenues	337	190	170	2217
License agreements with revenues in respective year	20	17	19	21
New start-ups (on basis of formal license)	2	0	2	5 (1)

UAS	2009	2010	2011	2012
Full-time equivalents (FTE)	14	13	15.5	23
Research contracts (incl. EU contracts)	319	457	374	621
Invention disclosures	15	21	31	35
Priority patent applications	6	16	5	8
Active patent cases end of the year	47	56	35	42
License agreements	11	14	16	17
Active license agreements end of the year	4	12	15	17
kCHF of net licensing revenues	174	514	466	567
License agreements with revenues in respective year	1	13	23	17
New start-ups (on basis of formal license)	5	9	8	14 (5)

APPENDIX 2 – KEY PARAMETERS FOR INDIVIDUAL INSTITUTIONS

This table lists individual data of those institutions that agreed to publish them.

Institution	Name TTO	Start TTO	3.2 TTO FTE	4.1 Total # of research contracts	5.1 # of invention disclosures	5.2 # of priority applications	7.1 # of IP agreements
Universities							
EPFL	EPFL-TTO	1993	8.1	227**	99	75	31
ETH	Transfer	1995	14	611	164	87	35
Uni Basel	Unitectra*	1998	11.2	135	29	17	17
Uni Bern	Unitectra*	1999		531	25	15	6
Uni Zurich	Unitectra*	1996		570	46	34	39
Uni Geneva	Unitec	1998	7.6	76	56	19	12
Uni Lausanne	PACTT	2000	7	145	21	8	4
RI							
Empa	TT Office	2005	3.5	150	26	18	6
PSI	TT Office	1999	3.6	130	14	14	5
UAS							
BFH	TT Office	2005	12.8	258	30	0	2

* *Unitectra is the joint TTO of the Universities of Basel, Bern and Zurich*

** *excluding EU contracts*

GLOSSARY

swiTT	Swiss Technology Transfer Association
Universities	Cantonal Universities and Swiss Federal Institutes of Technology
UAS	Universities of Applied Sciences
RI	Swiss Federal Research Institutions in the ETH domain
TT	Technology Transfer
TTO	Technology Transfer Office(s)
FTE	Full Time Equivalent (for the number of employees)
IP	Intellectual Property
SME	Small- and Medium-sized Enterprises (<250 employees)
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

APPENDIX 3 – THE QUESTIONNAIRE

swiTT Technology Transfer Survey 2012 (online survey)

Preliminary Notes:

- All questions refer to the calendar year 2012. 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's 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 type of institution.*	❑ Yes ❑ No
2.	**Background Information**	
2.1	Name of the academic institution/s	
2.2	Is your institution associated with an 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 have a dedicated office / responsible person for TT activities (TTO)?	❑ Yes ❑ No
	If yes, which year did the TT program start?	*[pub]*
2.4	Name of responsible for TT program	
	Name of responsible for survey data	
2.5	TTO address and contact information	
	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 December 31st 2011? *(Do NOT include researchers working as project managers in transfer projects 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	
	Comments to 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 contracts (see 4.3) and NO SNSF contracts)*	[pub]
	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? *(Definition: SME are companies with 250 or less employees.)*	A) SME: (B) Large Company (C) Public Institutions: *(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 full 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)*	

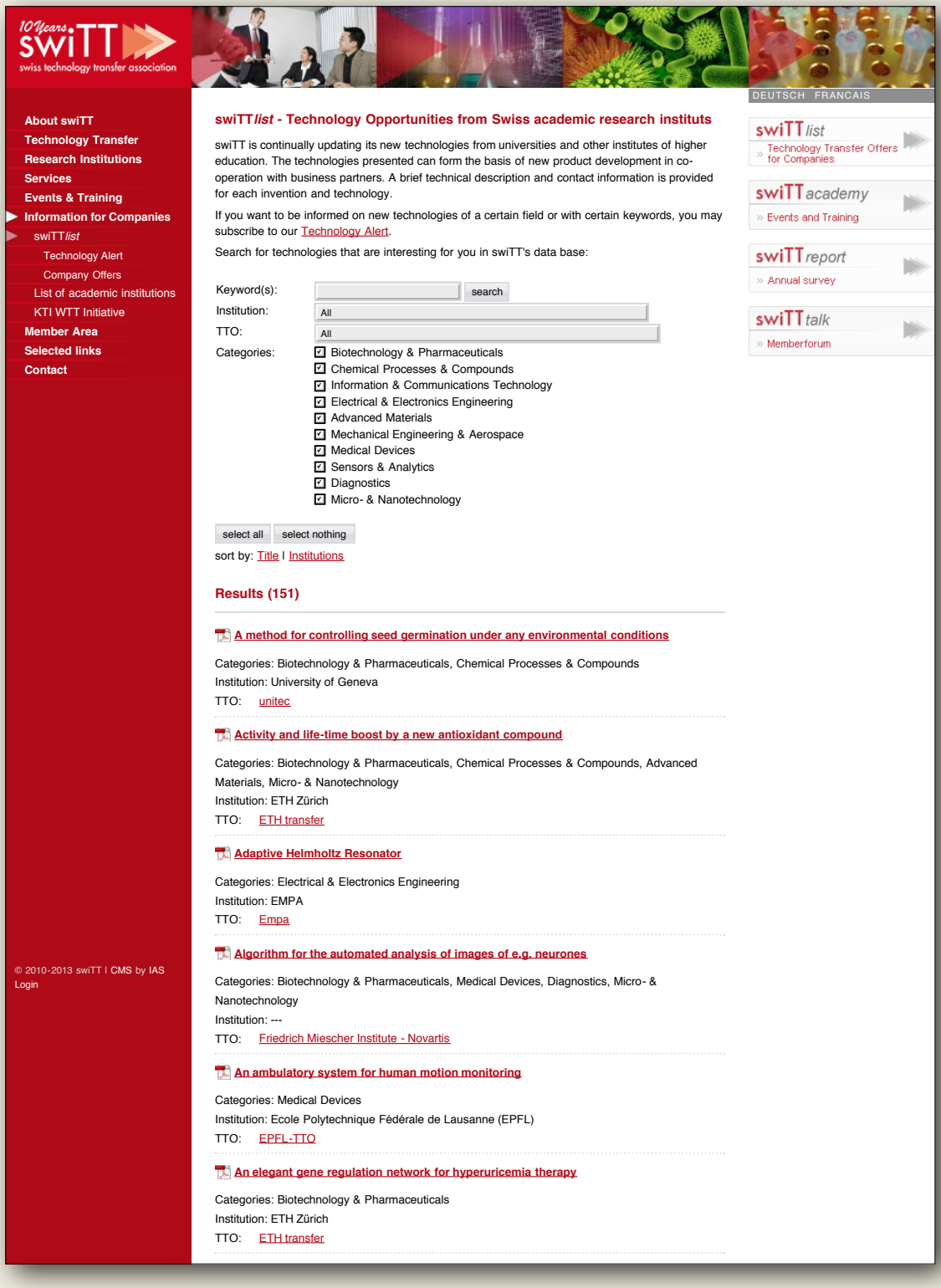
	Comments to 4.1 – 4.3 *(e.g. restrictions/regulations at your institution, knowledge of ALL contracts or only contracts above a certain amount)*	
5.	**Patent-Related Activity**	
5.1	How many invention disclosures were received by your TTO?	[pub]
5.2	How many priority applications were filed by your TTO? *(Priority application being the very first application for a new technology in any patent office of the world.)*	[pub]
	(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 2011 managed by your TTO? *(Active patents cases are pending or granted patents on a technically unique invention (patent family). Applications in various countries on ONE technically unique invention 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? *(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 contract.)*	[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: *(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, 2011?	
	Comments to 7.1 – 7.3 *(e.g. large variations to previous years, special situations, i.e. with free software licenses OpenBSD, etc)*	
8.	**License Income**	
8.1	What was the total number of licenses/options/sales yielding revenue?	
8.2	How many licenses/options/sales yielded running royalties? *(Running royalties are based on product sales and areonly due after the launch of a product in the market)*	
8.3	What was the total amount of license/option/sales revenue received at your institution? *(WITHOUT patent cost 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 or transfer of your institutions 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 the 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 2011?	❑ 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 any additional comments or suggestions to the attention of the team of the swiTTreport, please post them here)	

Thank your for your input!

swiTT
swiss technology transfer association

SWITT LIST

swiTT List carries well over 100 technology offers for Companies.
With the newsletter feature, you can easily set your preferences!



CONTACT

swiTT – Swiss Technology Transfer Association
3000 Bern
switt@switt.ch
www.switt.ch