We wish you an inspiring New Year 2017
For the third edition of its calendar, the Louvain Technology Transfer Office (LTTO) presents six new knowledge transfer success stories.

Through the testimony of researchers and CEOs, you will discover the history of spin-off creation: it4ip, 3D-Side, SynAbs, SmartNodes and Skemmi and learn about the signing of a partnership agreement with DiaSorin.

All these examples illustrate the continuity of collaborative ventures with regional economic stakeholders.

At one time or another in the history of these success stories, the protagonists have used some best practices during research theme definition, project implementation, protection of intellectual property or development of a knowledge transfer strategy.

Some of them are put forward:

*The patent as a source of information, Prior art searching in patent databases, Technology Readiness Level, Copyright protecting your original work, The Business Model Canvas and Choosing an appropriate license is part of an overall and thoughtful software strategy.*

The aim of these background papers is not to be exhaustive, but to draw attention to some critical points related to knowledge transfer, raise questions and inspire curiosity about the protection of intellectual property.

Hopefully all these success stories and synthetic documents will inspire other ideas and activities!

Jean-Christophe Renauld
Pro-Rector for Research
**THE PATENT AS A SOURCE OF INFORMATION**

**WHY?**
- Direct your R&D strategies
- Know the research teams in a field
- Determine emerging, promising technologies
- Search for precise technical information
- Discover potential partners, monitor your competitors
- Identify new players entering the market
- Define market trends and opportunities

**PATENTS = AVAILABLE INFORMATION**

The patent is an industrial property right which gives the patent owner the exclusive right to exploit an invention and exclude others from so doing as from a certain date and for a limited period.

In return, the technical information relating to the invention must be disclosed in the patent application so that anyone can reproduce it.

Patent applications are published 18 months after the filing date.

Patent applications contain technical, economic and legal information

*The claims define the scope of the legal protection*
Structured data
(classification codes, references, etc.)

Unstructured data
(documents: abstracts, descriptions, etc.)

Images

Sets of patents
(applications or granted)

Patents databases

- PatentInspiration*
  http://www.patentinspiration.com
- PatentScope*
  http://www.wipo.int/patentscope/search/en/search.jsf
- Esp@cenet
  http://worldwide.espacenet.com
- Google Patents
  https://patents.google.com

* These databases allow you to process information contained in patents through statistics.
In 1983, Prof. P. Macq, who was Rector at the time, set up a meeting between Y. Jongen (Cyclotron Research Centre) and Dr. R. Legras (High Polymer Laboratory). The idea was to launch the study of the interactions between energetic heavy ions and polymers and to consider the use of the UCL cyclotron as a tool to change the properties of plastics. Track-etching technology was developed and resulted in a first patent, filed in 1985.

In 1989 Cyclopore S.A. was created to manufacture and market the first generation of track-etched membranes. At the same time Dr. E. Ferain and Dr. Y.-J. Schneider developed research in the areas of polymer sciences and biology. Following its acquisition by Whatman, the activities of Cyclopore were finally relocated to the United States in the early 2000s.
The patent having come into the public domain, it4ip was founded in 2006 by most of the original team who had contributed to the research, along with L. Jonckheere, the former Cyclopore Product manager. The team soon also welcomed A. Groignet, its Chief Financial Officer.

The spin-off aims to develop, manufacture and supply unique polymer membranes (filters) whose pore size (10 nm to 30 µm), geometry and density (between 1000 and 10 billion / cm²) are perfectly controlled.

The result is an inexhaustible number of applications, including air monitoring, water analysis, microorganism capture, blood filtration and cell analysis, healthcare (biosensors and diagnosis assays), etc.

- **Next Step**: Launching of first it4ip devices production
- **2015**: Launching of a third production line for further capacity expansion
- **2011**: Commercial agreement with ArBrown (-Japan & -US)
- **January 2006**: Spin-off creation
- **2003**: “FIRST Spin-off” Grant
- **1989**: Cyclopore creation
- **1985**: Research project beginning

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FEBRUARY 2017

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AT LAST I’VE GOT MY RESEARCH PROJECT! I CHECKED IN THE SCIENTIFIC PUBLICATIONS, IT’S OK!

AND DID YOU ALSO THINK ABOUT PATENT DATABASES? 80% OF TECHNICAL INFORMATION IS ONLY AVAILABLE THERE!

PRIOR ART SEARCHING IN PATENT DATABASES

WHY?

To launch a research project, file a patent application, identify partners or competitors, and to assess freedom to operate.

WHAT IS A PATENT?

A patent is a right of ownership granted by a public authority on a geographical territory and for a determined period. This official right gives the patent owner the right to prohibit a third party from exploiting - in other words manufacturing, using, marketing and/or importing - the protected invention without the owner’s authorization.

Patent = technical solution to a technical problem

WHAT ARE THE CONDITIONS FOR AN INVENTION TO BE PATENTABLE?

- Novelty
- Inventive step
- Industrial applicability

WHAT IS PRIOR ART SEARCHING?

Prior art searching involves determining the state of the art, in other words all the information, patents or other publicly available sources before the filing date of an application.

Given that patents (currently several tens of millions of applications) contain a large amount of technical information that cannot be found anywhere else, patent databases are essential tools for effective state of the art analysis.

80% of the world’s technical information is only to be found in patents!
• **Conduct a prior art search** BEFORE filing a research project or patent application.

• **Define** the technical problem you want to resolve.

• **Stay alert** to everything that is/has been published by third parties or by inventors themselves (patent applications, scientific articles, presentations by public speakers, articles in non-specialist journals, invention exhibitions at a trade show, commercialization of inventions, etc.) since these form part of the state of the art and are therefore likely to kill the novelty and/or inventiveness of an invention.

• **Know the state of the art in the field** in question so that you can distinguish what is commonly known from what will be innovative.

• **Prepare your research strategy** by combining various search parameters: key words, classification codes, names of applicants (partners, competitors) or of inventors and citations. Adapt it using an iterative process based on documents found. Document it so that you don’t lose the main thread!

• **Complete the information** with the help of an advisor or specialist organization such as PICARRÉ.

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Use public databases that are free to use (or free in part) as a first line approach.


→ Esp@cenet: [http://worldwide.espacenet.com](http://worldwide.espacenet.com)

→ Google Patents: [https://patents.google.com](https://patents.google.com)

After seven years of research conducted under the supervision of Prof. B. Raucent (UCL-iMMC/MEED), in 2011 Dr. K. Tran Duy founded CenTIS, a spin-off specialising in 3D technologies for cranial reconstruction surgery.

Two years later and as a result of research performed since 2005 in collaboration with Prof. X. Banse (UCL-IREC/CARS), Dr. L. Paul created the spin-off Visyos with the aim of providing assistive technologies for surgeons carrying out osteotomy procedures. The two CEOs know each other and decided in 2015 to pool their mutual and complementary skills within a single company: 3D-Side.

### Staff:
- 9

### Collaboration with UCL:
- 3

### Marketed products / commercial contracts:
- 4 products, 1 contract in discussion

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Fond des més, 4
1348 Louvain-La-Neuve, Belgium

[www.3dside.eu](http://www.3dside.eu)

Assist surgeons by integrating 3D technologies in the operating theatre

3D-Side : a key player for the world of tomorrow
This spin-off assists the surgeon carrying out a challenging operation by combining engineering accuracy with medical expertise. Its role is to process medical images acquired during the diagnostic stage and bring new and useful information to the surgeon so that he can adapt his surgical treatment. 3D-Side also assists the surgeon in the operating theatre by manufacturing medical devices that helps him to replicate the pre-operative simulation.

This long-term process has involved surgeons, engineers and IT specialists, making it possible to develop smart assistive techniques, publish scientific papers and patents, and above all, provide treatment to many patients suffering from cancer.

- Next Step: Reach new countries and create synergies with companies which have similar products
- 2016: First contacts in Switzerland and Canada
- February 2015: Spin-off creation (merging of CenTIS & Visyos)
- 2011 & 2013: CenTIS & Visyos creation
- 2012: “Proof of Concept” Grant
- 2007 & 2010: “FIRST Spin-off” grants
- 2004 & 2005: Research projects beginning
UCL’s third mission, service to society, entails involvement in the socio-economic development of the region and of its enterprises. To this end, UCL proposes and participates in collaborative projects intended to support innovation.

Originating in the aerospace sector, the concept of TRL is a means to manage the development of a technology toward a practical application. Transposed to research, this tool will help you launch successful collaborative projects.

Comprising 9 levels corresponding to validation phases, it is generally divided into 3 time periods based on the predominant character of the work at a given time in the innovation process.

**WHAT?**

**TECHNOLOGY READINESS LEVEL: A SCALE OF MATURITY AND A TOOL TO HELP INNOVATE AND COLLABORATE**

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**MAY 2017**
The TRL concept is very useful since it provides a common reference framework for defining and evaluating objectives, risks and investments by the parties involved in a collaborative project.

The partners agree on a starting point at the outset of a project and together define the level of maturity to be reached within the scope of their collaboration, and the tasks to be undertaken.

It is therefore primarily a communication tool used for more effective collaboration by the partners in an innovation process, including enterprises, researchers but also financial backers. Indeed, identification of adequate funding can be more easily defined based on the levels of maturity to be passed through in the course of a project.

The generic scale presented here can of course be adapted using vocabulary specific to the area of collaboration and circumstances of the partners.

**Share the same language to assess the levels of maturity of a project**

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<td>Basic principles observed and described</td>
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<td>2</td>
<td>Solution and/or application concept formulated</td>
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<td>3</td>
<td>Solution/application proof of concept and feasibility analysis</td>
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<td>4</td>
<td>Integrated prototype validated in laboratory environment</td>
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<td>5</td>
<td>Product prototype validated for all its critical functions in relevant environment</td>
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<td>Product demonstrator validated in relevant environment with performance close to what is expected</td>
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<td>Product demonstrator validated in operational environment</td>
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<td>Commercial product, complete, qualified and available</td>
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<td>Product proven on different applications and subject to competitive production</td>
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**WHY?**

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**Share the same language to assess the levels of maturity of a project**

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**In collaboration with**

[Image of LIEU and AEI logos]
Heart failure (HF) is a major health concern because of its increasing prevalence and its human, societal and economic impacts. Integration of the know-how from the team led by Prof. Damien Gruson (UCL-IREC/EDIN and CUSL-Department of laboratory medicine) in neurohormones and the clinical knowledge of the team led by Prof. M. Rousseau (UCL-IREC/CARD and CUSL-Division of cardiology) was key in investigating the value of biomarkers for the prognosis of HF.
The quest received a boost in 2015, however, when it also obtained strengths in laboratory medicine and in vitro diagnosis thanks to a research partnership concluded with DiaSorin, an Italian multinational group specialising in development, production and commercialisation of diagnostic tests in a wide range of clinical areas. As vitamin D deficiency and hyperparathyroidism are common in HF patients, potentially contributing to cardiac remodelling, biomarkers derived from bone and mineral metabolism were assessed.

As a result of the partnership, accurate measurements of the biologically active metabolite of vitamin D (1,25-dihydroxyvitamin D) and its ratios to parathyroid hormone (PTH(1-84)), make it possible to strongly and independently predict cardiovascular mortality in HF.

- **December 2015: Research and collaboration agreement**
- **2015: Patent (first filing in collaboration with DiaSorin)**
- **2011: Research project beginning**
Copyright Protecting Your Original Work

**WHAT ARE THE CONDITIONS FOR COPYRIGHT PROTECTION?**

- **Originality**
  The original work must reflect the author’s personality, be the fruit of the author’s intellectual effort.

- **Format**
  The original work must be materialized, whatever the medium.

The following in particular are covered by copyright: books, scientific papers, correspondence, software, databases, graphs, drawings, plans, photographs, paintings, sculptures, etc.

Copyright protection is acquired automatically when the original work is generated and does not depend on completion of any specific formalities.

It continues to apply for 70 years after the author’s death, after which period it falls into the public domain.

**WHO IS THE AUTHOR, OWNER OF THE COPYRIGHT?**

The original owner of the copyright is the physical person who created the work.

The latter may assign his copyright (economic rights) or grant a license to any third party (an editor for example) wishing to exploit the work.

The law provides for cases where transfer to a third party is presumed. So for software, the employer is presumed, unless there is evidence to the contrary, to be the owner of the copyright on software created by its employees in the course of their duties.

**WHAT ARE THE RIGHTS OF THE AUTHOR?**

- **Moral rights** (right of disclosure, right to claim authorship, right of integrity) are intended to protect the integrity of the work and the author’s reputation. Being closely linked to the author’s personality, they are inalienable rights and cannot be assigned to a third party.

- **Economic rights** (right of reproduction and communication to the public, right of adaptation and translation, etc.) allow dissemination and economic exploitation of the work. These are exclusive rights of the copyright owner.

This means that the third parties are prohibited from using the work without the copyright owner’s approval through a license or assignment.

Copyright covers the FORM in which an idea is expressed (a text or a drawing for example), but not the IDEA itself!
The law does however provide for certain exceptions where use of a work without the creator’s agreement is permitted. Two of these apply more particularly to scientific publications.

- **The exception regarding quotation** allows copying of a short extract of a work for the purposes of review, teaching or scientific work provided that the source and author’s name are acknowledged.

- **The exception regarding use for the purposes of teaching and research** allows copying of all or part of a work, for the purposes of illustration for teaching or research, provided that there is no commercial purpose, no conflict with normal exploitation of the work by the author and provided that the source and author’s name are acknowledged.
Monoclonal antibodies have been produced for research purposes within UCL-IREC/CHEX for several decades. The advent in modern research and In Vitro Diagnostics (IVD) of these antibodies, which combine the capacity to selectively bind a wide variety of targets with the ability to act as therapeutics in inflammatory disease, autoimmune disease and cancer, logically led to the founding of SynAbs SA - “Singular Antibodies” - in September 2015. The scientists behind the spin-off - Prof. P. Gianello, Dr. Y. Nizet and D. Argentin - received support from Wallonia Biotech Coaching and work in partnership with the French based group Biotech Investissement.

Driving monoclonal antibody innovation for the In Vitro Diagnostic and biopharmaceutical R&D markets

SynAbs : a key player for the world of tomorrow
The spin-off is an ambitious Belgium-based CRO, generating and manufacturing innovative monoclonal antibodies for IVD and biopharmaceutical R&D applications. It has gained strong international recognition thanks to its expertise in the production of rat monoclonal antibodies, either through its services to CROs (mAb and custom immunoassays) or through its product catalogue (more than a hundred secondary anti-immunoglobulins). More recently, SynAbs has launched new IVD tools, thanks to an unique Guinea Pig monoclonal antibody generation platform.

- **Next Step**: Impose SynAbs as the key European player in the field of the innovative monoclons for R&D & IVD markets, thanks to its “Singular Antibodies” (2017)
- **2016 (Q3)**: First contracts with US & UK companies
- **2016 (Q1)**: First successful contracts with Belgian partners
- **September 2015**: Spin-off creation
- **2005**: “FIRST Spin-off” Grant
- **1990**: Research beginning

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The Business Model Canvas: A Strategic Management and Entrepreneurial Tool

In 2004, Alexander Osterwalder completed a Ph.D. thesis on business models with Prof. Yves Pigneur (HEC Lausanne, Switzerland).

The Business Model Canvas was born!

Two years later the approach outlined in his thesis began to be implemented around the world.


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A Little Bit of History

In 2004, Alexander Osterwalder completed a Ph.D. thesis on business models with Prof. Yves Pigneur (HEC Lausanne, Switzerland).

The Business Model Canvas was born!

Two years later the approach outlined in his thesis began to be implemented around the world.

Describe, design, challenge, invent and pivot your business model!

The Business Model Canvas - often referred by the acronym BMC - is a visual representation that facilitates iterative development (or adaptation) of new (or existing) business models. It is composed of nine blocks which helps an entrepreneur to build a value-added proposal to customers and understand the financial in- and outflows involved in his/her business.

The BMC is designed for building business models through brainstorming sessions. It provides a holistic view of the business as a whole and gives people a shared language, leading to better strategic conversations and better ideas on the table.

**VALUE PROPOSITION**
What need / problem does your project address? What is your added value? What are the strong points compared to the competition?

**KEY PARTNERS**
Do you need external providers to promote your product/service, to complete your service offer etc.?

**KEY ACTIVITIES**
Which activities are essential to allow your economic model to work (production, supply chain, software development, network, platform, problems solving etc.)?

**KEY RESOURCES**
What resources are essential to the functioning of your business: premises, equipment, machinery, financial resources, human resources, software, brands etc.

**COST STRUCTURE**
What are the different types of costs related to the business model (cost logic, value logic, fixed costs, variable costs, economies of scale etc.)?

**REVENUE STREAMS**
What kind of income will be generated from each customer segment (from sale, subscription, rental / loan, licensing, brokerage, advertising etc.)?

**CUSTOMER SEGMENTS**
For each product and/or service, what groups of individuals or organizations do you want to reach? Are you targeting mass markets, niche markets, segmented markets or others?

**CUSTOMER RELATIONSHIPS**
What are the types of relationships established with each customer segment based on strategic objectives: to acquire, retain, upsell (personal assistance, self-service, automated services, communities, co-creation)?

**CHANNELS**
- How will you promote/sell your product and/or service?
- How will your customers assess your product and/or service?
- What after-sales service will you provide?
In early 2011, the GEPPADI project sought to rethink road lighting in industrial parks. Born out of an idea from the SPI with financial support from Wallonia, the project was conducted through close collaboration between ULg (Montefiore Institute / EMMI – team of Prof. J. Destiné), UCL (ILOC – team of Prof. A. de Herde) and two companies: Arthos Technics and Ronveaux.

SmartNodes was created in 2014 as a co-spin-off from ULg and UCL and specialised in the development and sale of innovative dynamic outdoor lighting solutions and public space solutions.

Val Benoît - Quai Banning, 6
4000 Liège, Belgium
www.smartnodes.be

Staff: 8
Collaboration with UCL: 1
Commercial contracts: 20 installations in Belgium and abroad


From innovative control of outdoor lighting to the smart city

SmartNodes: a key player for the world of tomorrow
“Light where and when needed, at the right level”. Maximal energy savings (80%) are achieved while maintaining the same quality of light and the same level of security as the usual static lighting infrastructure.

The spin-off supports Smart City solutions by integrating other sensors in public lighting networks. For maintenance or reprogramming purposes, network remote control is possible through a Central Management Software interface. Lamp status, power consumption, traffic statistics and sensor data can also be easily transferred and monitored using the cloud.

- **Next step**: Large scale deployment of Smart City solutions
- **2015**: Belgian Energy and Environment Award (“Business Product Innovation Award”)
- **2014**: First contract with the city of Wavre
- **October 2014**: Spin-off creation
- **2010**: Research project beginning
Software and databases are subject to copyright regulations and ownership of computer materials developed by researchers is transferred by assignment to UCL (source and object code, program or database architecture, preparatory design material, instruction manuals etc.).

As the university is not allowed to transfer more rights than it has, some questions need to be addressed during the early stages of software development.

By default, copyright protects the form of the source code and the executable software and applies as soon as an original work is created, without requiring any further formalities. A recognized official deposit of the source code, for example through the i-DEPOT service, is a way of proving that software was actually developed at a given time by a given person.

Also - unlike copyright - the patent protects the functionality regardless of how it is written. The software’s functions can thus be protected (even in Europe) provided that a technical effect can be proven.

All distributed software must have a license! What about yours?

Choosing an appropriate license is part of an overall and thoughtful software strategy.
Research groups need a licensing strategy for all their software results. This is required to tackle specific aspects of software development such as external code reuse, access to the source code, eventual capture of part of the value, collaborative development etc.

The license used for the distribution (in the broadest sense: installing software on a computer, selling it, offering it for download from a website etc.) should be determined as early as possible. There are three main distribution models that are used in the university to define the rights of the owner and users.

**OPEN-SOURCE**

Choosing an open-source license allows one to share the source code on a large scale. This can speed up development and makes dissemination easier. Open-source does not mean without constraints: legal obligations often arise, especially when integrating existing open-source modules.

→ Certain open-source licenses are mutually incompatible
   Sometimes this may prevent any distribution of the code, even free of charge.

→ A very large number of open-source licenses coexist, with a variable level of obligations for end-users
   They are basically classified into two groups i.e. permissive (BSD, MIT, Apache etc.) and copyleft (GNU, MPL etc.) licenses, although many variations exist.

**RESEARCH PURPOSES**

It is quite common to share computer materials with external collaborators in other universities or with the private sector. A software license agreement is really useful to define the terms and conditions under which it is provided (scope, duration, ownership, promotion guarantee etc.).

**PROPRIETARY**

Choosing proprietary distribution means that control is retained and makes it easier to sell the software. The source code is not distributed on a large scale, and this is the case with most commercial licenses. This model is sometimes imposed by a research partner.

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**NOVEMBER 2017**
Skemmi was founded in 2013 by Dr. J.-Y. L. Lawson as a result of a research programme initiated in 2004 by the European Union and then supported by the Brussels Capital Region under the supervision of Prof. B. Macq (ICTEAM/ELEN).

This spin-off creates and develops emotionally powerful and interactive crowd experiences, at a conference, a cinema, a festival or any group gathering, to improve the impact and retention of messages.

Skemmi builds breathtaking and engaging augmented-reality games, played by a crowd (50 – 2000 people) on very large screens in which each participant interacts and engages with the digital content.
Thanks to the collective emotions generated on demand, it is possible to create a strong sense of identity fusion, boost social integration, increase empowerment, modify attitudes toward symbols and generate positive affects among audience members.

“If you want people to remember you, don’t go for the brain (it’s too busy anyway), go for the heart”.

Accordingly, all products are interactive communication solutions based on crowd psychology, augmented reality and gaming.

- **Next step**: Growth and international partnerships
- **2016**: Disney & Connected cinema rooms
- **2015**: First funding round
- **2013**: Kinepolis installation
- **April 2013**: Spin-off creation
- **2010**: “Spin-off in Brussels” Grant
- **2008**: Research project beginning
The knowledge transfer at UCL dates back to the early eighties.

To its credit? Nearly 75 active spin-off companies - which today generate over 2,400 jobs –, about 100 patent families, and a number of side benefits (e.g. services to third parties or new research programmes). All of those factors contribute to developing the economic activity and the Society.

This calendar is aiming to emphasise some success stories that best illustrate the history of knowledge transfer at UCL, but also some best practices to use during research theme definition, project implementation, protection of intellectual property or development of a knowledge transfer strategy.

May all these examples inspire other ideas and activities, not only for 2017 but also for the years to come.

We wish you an inspiring New Year 2017!

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