VACCINATION, AN ACT OF GOOD CITIZENSHIP

CAN WE LIMIT THE IMPACT OF PESTICIDES?

WHAT IS A COLOR?

UNIVERSITIES COMING TO THE AID OF SECULARISM

Homo apprenticesus
Pipe of Skate-board
(Darwin, Bordeaux)

© Olivier Got

Send us U photos at u-magazine@u-bordeaux.fr
Each photo will be credited with its author's name and a brief description.
Even before the invention of universities, society sought to organize knowledge transmission, and therefore often “learning,” as well, deeming that there was a fundamental need for individual and collective progress, a strategic subject for the development of countries, and at times an object of power. Universities played a key role in this domain even if, depending on their history, approaches were different, and at times too often linked, as in France, to specific subject areas.

National educational objectives in different countries and the knowledge-based economy have today created demand for learning on an unprecedented scale, with a gradual shift to a requirement for results instead of a requirement for means. It must be noted that teaching has not kept up with the pace of progress achieved by science and technology, a challenge facing all educational systems.

Regardless of their heritage, universities must rapidly commit themselves to a real transformation of their educational systems, and change their paradigm: they can no longer settle for merely “teaching,” but must instead “teach how to learn.” Two fundamental steps must be taken in order to do so. First of all, conditions must be created for intelligence in today’s digital world where learners must be supported, rather than giving them partial information as we once received, in the seats of a lecture hall. Secondly, the walls between different subject areas must be torn down since solutions for current societal issues, scientific progress, and conditions for innovation are to be found precisely through the overlap and interaction between different subject areas. This evolution must take place within an open system, which implies citizens aspiring for progress and economic players seeking new expertise to further their development, a system open to other countries around the world. The University is well-positioned to achieve these goals.
4 Vaccination, an act of good citizenship

6 Victor Segalen:
A traveler at heart, an explorer of the soul

8 Mathieu Bécue:
innovation within reach
Vaccination was a major scientific breakthrough, enabling the elimination and even the eradication of serious infectious diseases, yet it has constantly been surrounded by controversy since the invention of the inoculation against smallpox in the late 18th century. Are vaccinations truly more beneficial than dangerous? Can collective interests be maintained while still respecting individual freedom?

An effective vaccine equips the body with defense mechanisms for fighting a disease, usually a contagious one. When the proportion of vaccinated individuals in a population – known as the vaccination coverage – is high enough to break the chain of transmission, non-vaccinated individuals are indirectly protected: this is referred to as herd immunity. We therefore get vaccinated to protect ourselves and to protect others, particularly the most fragile among us. And when other individuals get vaccinated, they also contribute to our protection.

In Western countries, we have progressively forgotten what we no longer see: paralysis caused by poliomyelitis, encephalitis caused by measles, and deaths caused by tetanus. This remarkable efficiency has often been obtained in combination with other prevention measures. However, when the vaccination coverage becomes insufficient, these diseases, and their serious complications, can reappear. As recently as 2015, a Spanish child died of diphtheria and another child died during a measles epidemic in Berlin.

Vaccines: Possible toxicity?

For over thirty years, controversy has grown surrounding the possible toxicity of vaccines. In the 1990s in France, a poorly managed vaccination campaign for hepatitis B led to the mass vaccination of adults for whom the vaccination was inappropriately prescribed. Over 20 years later, there is still considerable debate about the cases of multiple
sclerosis potentially caused by this vaccine, and scientific uncertainty persists. More recently, the aluminum-based adjuvant found in certain vaccines was blamed for the occurrence of cases of macrophagic myofasciitis – a syndrome characterized by chronic fatigue, along with muscle and joint pain. The remarkable French drug monitoring system recognizes the evidence, yet it remains difficult to pinpoint what is to blame.

A certain degree of trust despite concerns

France’s vaccination policy includes a requirement to vaccinate children for diphtheria, tetanus and poliomyelitis, as well as recommendations based on a regularly updated vaccination schedule. The schedule has evolved and has progressed from the immediate protection against diseases that are deadly in children, to the long-term prevention of diseases (cirrhosis and liver cancer for hepatitis B, cervical cancer for the papillomavirus). Furthermore, considering the technical skills and production costs required to manufacture them, vaccines are produced by a limited group of companies and the vaccination policy is therefore dependent on the decisions taken by these companies and is at the mercy of supply shortages. While all of these aspects are concerns expressed by the anti-vaccine leagues and associations, a sense of trust remains dominant amongst over 90% of family physicians, as revealed in a study conducted by Inserm in 2010. It is also interesting to note that within the i-Share group – the largest scientific study ever realized on young people’s health – vaccination coverage is systematically higher amongst students in the field of healthcare.

However, the ability to discuss with their physician is an important determinant in adults’ positive acceptance of vaccines, and this determinant has made progress: 80% in 2014 compared to only 60% in 2010, according to the Agence nationale de santé publique health barometer. French monitoring data, in particular the data from Aquitaine, shows that the vaccination coverage for children for diphtheria, tetanus, poliomyelitis, pertussis, and pneumococcus is close to the target of 95%. However, these levels are insufficient for certain vaccines, such as hepatitis B and papillomavirus among adolescents, and influenza among adults and the elderly.

Following the Hurel report on vaccination policy in January 2016, a national conference on vaccination was launched. However, the debate demands greater objectivity, since vaccination supporters and opponents both have the same goal: promoting health for all ages. It is, above all, very important to remember the right reasons to get vaccinated, to analyze the circumstances of the recent crises, and identify the recognized risks, so that each individual has a sense of being informed and confident, convinced rather than forced, empowered rather than guilty.

All citizens should be able to make informed decisions about their health.

“It is important that each individual has a sense of being informed and confident, convinced rather than forced, empowered rather than guilty.”
A traveler at heart, an explorer of the soul

Victor Segalen, naval doctor and, above all, man of letters. He was the author of a considerable body of work left unfinished and led a short but intense life. A few metaphors help us understand the journey of this astonishing figure, the man whose name was once associated with the Bordeaux campus.

If Victor Segalen were a profession, he would have to be several, since it is impossible to limit him to only one activity. First of all, he was a naval doctor. Despite disliking the sea, he continued with this role until the end of his life, not so much out of passion but as a way of enjoying financial independence. Endowed with musical and drawing skills, he became a writer, poet, an archeologist and an art critic... A recognized expert on China, he discovered the site of Emperor Qin Shi Huangdi’s tomb in 1914, the place where the famous Terracotta Army would be uncovered 60 years later. If Victor Segalen were a country, impossible, he would have to represent the entire world. In 1906 he wrote, “I was born to travel, to see and feel all that there is to see and feel”. And while Polynesia and China impacted him as a man, doctor and above all as a writer, he also travelled across the United States, Java, Sri Lanka, Djibouti, Ceylon, Oceania, Japan, Algeria, England, Russia, Norway... Each place represented a source of inspiration. As he saw it, there was no writing without travelling, and no travelling without writing. He embarked on inner journeys as well, as he mentioned in his work *Les origines de la statuaire en Chine (The origins of the statuary in China)*: “As always, we make a distant journey out of what was actually a journey deep within ourselves.”

**Infinite and unclassifiable works**

If Victor Segalen were a literary genre, he would be ever-changing and limitless. “I must complete three tragedies, ten novels, four essays, two theories of the world, a poetic work, an exotic work, a work on esthetics, a treatise on the hereafter, a general directory on unknown things, around twenty unclassifiable works, and 4,063 articles of 200 to 2,000 lines before I retire,” he wrote in 1918 – this from a man, who seemed to get an idea for a new work every minute. The only requirement he set, as a scientist, was to gather information about his subject before writing about it. His narrative style, far from traditional, gives the impression of reading another language, although he wrote in his native French. In a literary journal, *La Revue des lectures* (1922), a critic wrote of an unusual writer with a "tense, elliptical, and dense style, riddled with neologisms (…)". Only three works were published during his lifetime: *Immémoriaux* (1907), *Stèles* (1912) and *Peintures* (1916). If Victor Segalen were a mystery, it would be that of his own
death. Accident or suicide? The answer remains a secret. He was found in a pool of blood in the heart of the Huelgoat forest in Brittany, in an almost theatrical position, with a tourniquet on his leg that appeared to be insufficiently tightened. And to add to the confusion, only three minutes from a road where he could have received assistance.

Since his medical studies in Bordeaux, Victor Segalen had been passionate about the “the underground universe hidden below the surface of consciousness”. He completed his non-residential internship with Professor Albert Pitres, whom he referred to as the “great master of nervous disorders”. His interest in this new discipline of psychiatry was influenced by the fact that he was subject to fits of melancholy since the age of 15. Between 1900 and 1918, he experienced several bouts of neurasthenia, which we would now call depression. Victor Segalen’s health, of a rather sickly constitution since his childhood, was never better than when he was travelling. It was his more efficient antidepressant, excluding the opium he had been smoking almost daily for years. His health would decline as soon as he returned to France “in exile”, as was the case between 1915 and 1918. “I do not have any known, contracted or bearable disease. And yet, it seems as if I were seriously ill. (...) I can simply perceive life drifting away from me”, he wrote to a friend early 1918. He even said he felt “cowardly betrayed by his body” a few weeks before his death.

If Victor Segalen were an era, he undoubtedly would not be his own. At times too far in the future, he was at times too far in the past. In terms of literature, he praised the diversity and origina lity of civilizations, and lamented the Western progress that was spreading throughout China in particular. His (overly?) modern texts gave a voice to foreigners in an era of colonialism. As for his personal life, Victor Segalen lived his life rather dissolutely, with a clearly anti-Christian aspect that his parents struggled with. In terms of love and friendship, he was faithful at heart (but not in the flesh), and seemed rather indifferent about fatherhood, despite having three children with his wife and life companion, Yvonne. He was not well known or recognized during his lifetime, and remains little known today, despite the many works written about him. Victor Segalen led a short yet hyperactive life that could be described as insatiable and extreme.

A question remains: what works would he have left behind if he had not passed away at only 41 years of age?

“A few key dates:”

- **January 14, 1878**
  Born in Brest as Victor Joseph Ambroise Désiré Ségalen (he removed the accent in his last name in 1912)

- **1898**
  Ranked second in the entrance exam for the Naval Medical School of Bordeaux

- **January 29, 1902**
  Received his doctorate in medicine from the medical school of the University of Bordeaux, by defending his thesis entitled “Medical observation by naturalist writers.”

- **January 23, 1903**
  Arrival in Tahiti

- **1905**
  Married Yvonne Hébert, the daughter of a doctor from Brest. They had three children, Yvon, Annie and Ronan.

- **1907**
  Published Les Immémoriaux at his own expense

- **1909–1913, 1913–1914, 1917**
  Travels and assignments in China

- **August 1914**
  Abandoned his quest to Tibet to return to France at the beginning of World War I

- **1915**
  Assigned a job at the Brest hospital to carry out administrative tasks

- **January 1919**
  Hospitalized at the Val-de-Grâce psychiatric unit

- **May 21, 1919**
  Death in the Huelgoat forest in Brittany

- **1996 - 2013**
  The University of Bordeaux-2 was called University Victor Segalen before the institutions merged to create the University of Bordeaux on January 1st, 2014

---

“I was born to travel, to see and feel all that there is to see and feel”.

— Victor Segalen (left) and his travel companion Augusto Gilbert de Voisins during their archeological expedition in China in 1914.

© Bibliothèque nationale de France
In his “innovation analysis kitchen”, Mathieu Bécue keeps his invention patents, scientific publications and an abundance of financial data. Heading a team of research engineers and working alongside professor-researchers, he is on a quest to better appreciate this environment where innovations for the future brew. Let’s take a closer look at this hyperactive chef cooking up several projects at once.

Mathieu Bécue

Innovation within reach

ock and funky drums and bass, Hispanic trumpets and captivating choirs... Brazilian singer Tom Zé’s song dor et dor is dynamic, exotic and surprising. These same three adjectives could be used for one of his listeners: economist Mathieu Bécue. This specialist in technological intelligence, a hyperactive (ex)-globetrotter and lover of spicy music has many projects on the go! Mathieu, a research engineer with Gretha¹ and the director of Via Inno, a center for social innovation,² was awarded the crystal medal from CNRS this year, an award recognizing his research work. If the term “technological intelligence” doesn’t mean much to you, and if feeding you sectoral analyses can lead to indigestion, don’t worry: Mathieu Bécue’s journey is nothing like a tiresome equation. Born in Normandy, he took his first steps as an infant in Syria. Then at age 4 he returned to the land of calvados and became a tennis player. From one competition to another, he even played on the red clay of Roland-Garros in the 4th series level. After falling in love with his future wife, also an economic specialist, Mathieu left his family’s home early on and attended several training programs in industrial economy and development economics – at the University of Rouen and then in Paris– choices that were for both practical and sentimental reasons. The fact that he started off with a Bachelor’s degree in Economic and Social Administration can be explained by his need, already very present at the time, not to approach economics exclusively based on mathematical modeling. “That has always been a concern of mine. Economic analysis does not mean much without taking a variety of components into account, such as the legal field, for example.”
His choice of location for his first work experience, in Guinea-Conakry, was because his partner found a job there. He became a financial analysis teacher at Gamal Abdel Nasser University and worked for the CIRAD. The couple moved to Guadeloupe, then to Paris – where Mathieu worked at Institut Xerfi, a famous sectoral analysis firm – and then to Brazil for an international volunteering opportunity with the development research institute, IRD (Centre de coopération internationale en recherche agronomique pour le développement) and the University of Bordeaux unit. When he finally arrived in Bordeaux, Mathieu began a doctoral thesis that he later abandoned before his defense. The elusive economist, who had already turned down another thesis and the Paris Institute of Political Studies, decided to promote the knowledge acquired from his research laboratory among the industrial world and communities by setting up an economic development observatory: Via Inno.

**Numbers and flippers**

Orbit, SCD platinum, Zephr, Diane, Lexis Nexis, Web of science, Scopus… Hiding behind all these names are databases full of financial and scientific data and patents for inventions. This is the raw material that Mathieu Bécue works with. As he combines these ingredients, he identifies innovation pathways. What’s his goal? To win first place in the 100 meters freestyle event. “I wouldn’t want to jump into the swimming pool without flippers.” The master swimmer’s toolbox is full of methods and tools for acquiring and using databases. The “swimmers,” representing a variety of players – territories, companies, research projects – are seeking to find out more about the dynamics of their sectors, and identify partners and potential competition. Mathieu has put his technological intelligence skills to use with Via Inno, which in 2012 became a University of Bordeaux Socio-technical Innovation Center. This was truly a springboard for the structure, which rapidly grew, with several joint laboratories created alongside very important industrial groups: “The idea behind these structures is to have stable partnership frameworks available in order to transfer our skills to these groups. The most recent partnership will begin in September 2016 with the Michelin group.” A genuine success.

**Swinging in the open space**

After his hard rock phase, with festivals like the one in Vincennes in 1991, where ACDC and Metallica rubbed shoulders, Mathieu Bécue returned to more soothing sounds, alternating between jazz and ska. He loves listening to music, and his team gets to listen along in their open space! Venturing far from the dogmas of the traditional office setting, Mathieu is a co-working enthusiast in need of momentum: “I can’t stay still in my seat for fifteen minutes,” he confesses. The team is currently planning to buy standing tables. “I am unable to concentrate on one thing at a time. I have to work on three, four projects at the same time,” he admits. At the same time, he takes time to share his knowledge. “The ability to easily present knowledge is a good way of formalizing that knowledge. I like to structure things simply: this allows for the transfer of skills.” Being both a teacher and an engineer is a strength. Mathieu teaches several Master’s program classes, at the university and at Bordeaux INP, in both economics and engineering science.

Although he has settled in Bordeaux, Mathieu has kept his vagabond nature. As soon as he gets a chance, he travels abroad, to the beach, or simply on his bike. He sometimes even feels the urge to head south. Could it be Brazilian nostalgia? Who knows where he will be ten years from now…

“I like to structure things simply: this allows for the transfer of skills”.

---

1 Groupe de recherche en économie théorique et appliquée (Theoretical and Applied Economics Research Group, a CNRS and University of Bordeaux unit)
2 An interface between research and the socioeconomic world, aimed at developing services related to the expertise developed in various research fields
3 Centre de coopération internationale en recherche agronomique pour le développement (Centre of International Cooperation in Agricultural Research for Development)
Homo apprenticus
I am, therefore I learn; I learn, therefore I am. Inevitably. Invariably.
The Latin for learn is *apprehendere*, with its root *prehendere* meaning take, seize with the mind. A transitive verb with polysemic meanings. What is learning?
Acquiring, becoming informed, teaching, transmitting, and also informing and communicating. What do we learn?
Knowledge, wisdom, facts, know-how, information, news...How do we learn?
Through study, practice, experience, transmission and sharing...

Learning is a driving force in both personal and societal evolution and is also a vehicle for progress on a global level. Learning, a notion without beginning or end, combines the present, past, and future and requires a continual creation of links between these three dimensions of time.
Learning, a cerebral process which is so complex that the neurosciences and cognitive sciences continuously try to understand it.
Though the cells of our tireless brains are capable of regenerating themselves as we get older, our learning capabilities, while permanent, are unequal and fluctuating. And this is not simply a matter of neurons. It also relates to an individual’s social and cultural origins, environment, and quality of life. This problem is present in the school setting, among others. School, the major place for early learning, is a vast and widely-debated subject. It is popular among politicians, who without fail launch a new school project every five-year term. At the beginning of this new school year, middle school is in the limelight due to a much-discussed reform with the goal of “better learning for better tools success,” which must ensure that every child has the means to progress. This is a real challenge for teachers, who must continue to learn how to teach in order to best convey information by deconstructing subject-specific knowledge and introducing new kinds of teaching methods often linked to the development of digital tools. Because the arrival of this new technology is certainly upending traditional ways of learning… There is an ever-growing range of possibilities available online in the form of MOOCs (massive open online courses), serious games, educational sites and various other diverse tutorials, stirring up our desire to learn…and dematerializing places for learning.

Twenty years from now the university will have developed an entire array of teaching innovations, incited a large portion of its students toward mobility, and at the same time encouraged many others to pursue apprenticeship programs in the professional world. But it will also continue to invite middle school and high school students to discover its research activity through science outreach programs. Because all forms of technology are only means rather than ends, learning will never be solely virtual. Learning, a verb which is adaptive, productive, progressive, and inventive: the prerogative of *homo apprenticus* on his eternal quest to know more… live and learn!

“Life must be a constant education; one must learn everything, from speaking to dying…”

Gustave Flaubert / Correspondance
Psychologists, cognitive science specialists and neuroscience specialists can describe and explain learning inequalities among individuals. When it comes to the distribution of performance at the individual level, should we refer to inequalities or rather differences? That depends on the criteria and tools that allow us to measure individual performance.

For sociologists, things are simpler. In general, they measure performance inequalities on an entire population’s common academic criteria, whether it be their academic level or the results of the national and international tests. These measures are basic, but they have the advantage of being relatively homogeneous. When we take learning back to these simple, even simplistic, criteria, the conclusions are also simple, even simplistic. Of course there are always performance inequalities that exist among individuals from the same social group, but on average, academic performance seems to be determined by students’ social origin. Let me be very clear: individuals’ social origins do not determine their performance level, but, on average, social origin determines the average performance of a social and cultural group.

A law?

The impact that origin has on students’ performances is therefore present like a sort of unpleasant “law”, a law we must try to explain. In general, two main reasons are put forward. The first involves the direct effects of economic inequalities on academic learning: the greater children’s quality of life, the better their academic performance. But what counts even more than economic equalities are cultural inequalities. The richer and more elaborate a child’s lin-
In the linguistic world, the greater their chances of having advanced and high academic performance. The more time families spend on activities that prepare children for academic learning – reading, reasoning games, etc. – and establish a disciplined approach to life, the greater the chances of good academic results for the children. The higher the parents’ level of education, the more ambitious they are for their children and, as a result, their children are more confident.

Cultural inequalities appear very early in the lives of individuals, and are based on implicit educational attitudes. Indeed, the proximity between families’ educational practices and school requirements plays a decisive role in the social inequalities in academic learning. In this way, we observe that girls do better at school because families generally require girls to behave in a way that is more consistent with school requirements, like being serious and attentive. Finally, we can add that socially privileged families are well acquainted with the school setting, its organization, its codes and expectations, and they are therefore more effective in helping their children to adapt.

An aggregation of inequalities

Inequalities in academic learning, and it must be noted that this does not mean all learning, result from an accumulation of small inequalities that end up creating major inequalities by the end of the school career. Although children from higher socioeconomic backgrounds benefit from an initial privilege, this privilege is then accentuated by a wide range of factors. “Well-born” students have better chances of attending a high-level institution that will boost their learning. They also have higher chances of receiving better guidance and being “pushed” by their parents and teachers, who are more optimistic about their future. The sum of all of these little inequalities throughout their school education adds up to big learning inequalities. In most cases, the students that make up the academic elite come from academically elite backgrounds, whereas students who fail academically in less favorable circumstances come from the most disadvantaged social classes.

What can be done?

International comparisons show that although the “law” of social learning inequalities exists in every country, it is not always as severely widespread in every country. In some countries, academic inequalities are greater than what would be expected based purely on social inequalities, whereas in other countries the opposite is true. In other words, the inequalities in academic learning also depend on the educational programs that are offered: the system’s organization, guidance mechanisms, teachers’ attitudes, the cost of education, etc. In this area, there is always room for improvement. We also must never forget that academic learning does not represent all learning, and academic skills are not the only necessary skills for individuals and societies.
I know because I learn. How to pedal, how to swim, my name, the color of a ladybug, even the awful foreign language grammar course... An ocean of information that the brain pumps relentlessly and efficiently. Let’s take a journey deep into the heart of convoluted neuronal circuits, through the hippocampus and the overheated cortex.

The mechanics of knowledge! a well-oiled machine!

"We learn because there’s something to learn." While this declaration may seem to state the obvious, Frédéric Alexandre is happy to explain more: "Learning would not take place if everything were random, if there were no regularity in the world, no cause and effect relationships." Here, the INRIA research director, head of the Bordeaux Mnemosyne team with IMN, has identified the fundamental requirement for all learning. Example: a little baby shakes her favorite rattle.

Memory mishaps

She has a pacifier in her mouth and makes regular sucking motions. Suddenly, she lets go of the toy. Surprised by Newton’s law of gravity, the sucking accelerates and she raises her eyebrows. The action is repeated once, twice, then three, four times… It will be a few more months before the infant integrates the effect of gravity. We have this same experience with the patterns at work in our environment, and it is what enables us to form and learn concepts. Natural laws, but also the association of a word with an object, a concept… The things we learn are stored in specifically targeted locations in our brains: our memories. There are different types of memory. To keep things simple, let’s first differentiate short-term and long-term memory. The first is our working memory: it enables us to retain and handle around seven pieces of information for

Drawing a blank?

The Swimming Pool, with Romy Schneider? You might be sure you’ve seen it, but not be able to say a thing about it. Forgetfulness constantly assails us. But have we truly "forgotten"? When neurons are no longer used together, or when they are used for other associations, recalling a memory can become more difficult. We generally associate this phenomenon with that of forgetfulness: a memory disappearing little by little. But today a controversy remains as to whether or not the difficulty in remembering is the same as having definitively forgotten the memory. It could potentially still be possible to bring the memory back. It is fascinating to think about what happens when we see someone we had "forgotten" for years; we are able to recall the person’s identity – and even more…
The things we learn are stored in specifically targeted locations in our brains: our memories.

a few seconds or minutes. The time it takes to walk to the bar and order the three drinks our friends asked for. The time it takes to keep the relationship between several numbers in our head in order to do a simple calculation. This is an essential memory type, from everyday life to academic learning. Long-term memory, on the other hand, is more complex. A distinction must be made between “know-how” and knowing facts, i.e. the difference between procedural and declarative memory. I know how to ride a bike because I learned how to pedal and balance. But I cannot explain it with words and “declare” it. Although they are complementary, each memory type has a unique role, as demonstrated in the famous case of the patient, H.M. At the time, in 1953, doctors removed parts of the patient’s brain to treat his epilepsy. It was the wrong move, and the patient became amnesic. “If they had him practice the same skills every day, he would improve... and still not remember he had played before!” explains Frédéric Alexandre.

Neurons buzzing with activity

His procedural memory was not affected, because his skills were increasing. However, his declarative memory was completely gone. To be precise, the patient’s problem was the hippocampus. It’s the structure that manages the episodic declarative memory, the chronological record of our autobiographical events, associating a fact with its context. “You remember right where and when you found out the name of the new president,” explains Frédéric Alexandre, “then you reuse the information without using the context, which is less useful information. We then pass from episodic memory to a semantic memory.” The declarative semantic memory is located in the large areas of the cerebral cortex and corresponds to general knowledge, to words and their meanings, to concepts. The hippocampus is therefore both the photo album from our childhood, full of anecdotes and emotions, and a machine that formats the memories into telegrams, retaining only the essential information; telegrams being sent to the semantic memory. H.M., without the hippocampus, could no longer remember family vacations or make new memories. He did, however, know that he was 30 years old and Truman was the president of the United States. In 1954... and in 2008 when he died.

The library of our brain looks sort of like playdough. “The brain is constantly malleable: learning is permanent and alters the way our networks are connected,” explains Nathalie Tzourio-Mazoyer, head of the IMN².
neurofunctional imaging group. “Network” here does not refer to 3G-type networks, but an almost fiber optic network: our tens of billions of neurons, brain cells and the basic units for learning, communicating between themselves via true electric cables, the nerve fibers. There are synapses between the two that act like dominoes. How does it all work? "While there are several types of memory, they are all governed by similar laws of learning," explains Frédéric Alexandre. Each time the neurons are stimulated together, the synapses between them are strengthened and become more efficient. Thus the neurons are more specifically associated and, later, when one is activated, it will activate the others. A dog barking is therefore recorded by a group of neurons that are strongly connected to another neuronal team, which encodes our visual representation of the animal. Neuronal networks are therefore very different based on learning. So, what are the differences that emerge between fans of math, geography or languages? To answer this question, brain MRIs will be analyzed from 2,000 students from the i-Share3 cohort. It has recently been discovered that brain maturation continues well after adulthood, with "an increase in myelination up to age thirty at least," explains Nathalie Tzourio-Mazoyer. Myelin is an insulating layer that prevents electrical loss along nerve fibers, increasing the transit speed of the information that is preferentially formed in the most stimulated networks. The myelination could occur differently from one learner to another. This is another factor that demonstrates the great malleability of tireless heads, in perpetual search of knowledge. ■ YF

Is learning specific to humans?

We have no doubt that cats and dogs can learn. But an insect? Seems unlikely. But, no! Just think about bees and their ability to memorize the shape and color of a flower in order to visit that specific one. And without neurons? A study published in 2014 in Oecologia on the Mimosa pudica, a plant capable of closing its leaves when touched, seems to show that these plants are able to learn. Monica Gagliano’s team from the University of Western Australia created a system that released drops of water on the leaves in a repeated manner. After a certain period of time, since the impact was not damaging to the leaf tissue, the plant’s leaves stopped closing. This information was then memorized: after several weeks without the water drops, when the drops started falling again, the plant did not close its leaves! A simple memorization process that does not even require one neuron!
What will universities be like in 2036?

Opened up, connected, collaborative, interdisciplinary... Educational teams at the University of Bordeaux share their vision for higher education twenty years from now.

The university has undergone a metamorphosis. A group of students is settled on sofas, attending a virtual course taking place on another campus. Plugged in to their laptops, they can ask the teacher questions and share documents with their fellow students all in real time. They have customized their course work according to their interests and professional aspirations. Over the course of their lives they will go back to school two or three times to gain the necessary knowledge and skills for new careers. Though it sounds like a utopian dream, this vision was developed by a group of students, teachers, and citizens through a collaborative project launched by the Learning Lab at the Catholic University of Louvain (Belgium) in 2015. This joint project gave rise to more than a hundred proposals for imagining the university of tomorrow, and questioning the practices of today.

Reconsidering the role of universities

Even though we must be cautious when delving into futurology, a change of culture has indeed been underway in French universities for several years now. In 2014, the University of Bordeaux created the Support for Innovation in Education Initiative (Mapi), which, at the time, was an original institution in France, to support educators during this period of great and necessary changes. "The goal is to help educators benefit from others’ experiences, provide support for innovation in teaching methods, and establish communities of practices," explains Marthe-Aline Jutand, the Director of MAPI from 2014 to August 2016. "We also want to follow a less 'top-down approach', and let
“The first challenge is mobility: students and learners of tomorrow must be able to learn from anywhere and on any mobile device; physical distance from the institution must no longer be an obstacle”

Claude Dupuy, researcher at Gretha

educators seize innovations for themselves,” adds Achille Braquelaire, Vice President in charge of Education. Among the first projects supported: Mooc’Innov+, winner of the 2015 Digital Idefi. “Today universities are faced with a number of important challenges,” says Claude Dupuy, a Professor of Economics and researcher at Gretha where the project was developed. “The first challenge is mobility: students and learners of tomorrow must be able to learn from anywhere and on any mobile device; physical distance from the institution must no longer be an obstacle. There is also knowledge accreditation: universities have a role to play in the dissemination of knowledge and its reliability. Additionally, we must develop globally-minded, collaborative teaching methods. Finally, there are technological challenges. Though we live in a period marked by the rapid development of learning analytics, with tools for evaluating and optimizing learning processes, France lags behind in this area.”

This led Claude Dupuy to develop the university’s first MOOC in 2014, dedicated to the economics of innovation, and to later create the MOOCInnov+ initiative in collaboration with Bordeaux INP. One of the project’s goals is to develop the University Lab, a mobile applications ecosystem available to all students on their smartphones. It will include a project management application with collaborative tools for brainstorming, scheduling and mind mapping, as well as a search engine for qualified tutorials, Moocs etc. In short, a new university experience. “We work with free software, so that any university may use this ecosystem and adapt it to its needs,” continues Claude Dupuy. Christophe Roiné, the new director of Mapi, is working on another digital project: developing a collaborative note-taking space. “A PhD student in Educational Sciences is currently working on this topic,” says Christophe Roiné. “Initial findings show a strong link between a student’s style of note-taking and his/her exam results. Interactive note-taking would help students better assimilate subject matter and enable teachers to monitor student work more closely.” However, the researcher cautions against an obsession with an all-digital learning model. “Digital technology is not educational by itself. We must be wary of ready-made, generic solutions. For example, Moocs are not the panacea for all types of educational programs. Innovations in teaching and learning are only meaningful when they are initiated by teams seeking to resolve specific problems.”

Unlocking students’ creativity

Today’s employers are looking to recruit graduates who are creative, independent, and work well with others. “This is a real challenge for universities, who not only have to teach students these soft skills, but must also accredit them,” Claude Dupuy remarks. “As part of the MoocInnov+ project, creativity days led by designers and artists will be held for 150 third-year Bachelor’s students in Eco-Management. ‘We’re going to teach students design thinking,’ explains the researcher. ‘The goal is to encourage them to develop projects, while providing support for creating videos, writing pitches, etc. They will have all the tools they need to participate in corporate campaigns or to start seeking funds. This type of proposal responds to requests from students, who are increasingly independent. We’re even thinking about a serious game for creativity and developing a toolbox that graduates could import to their companies.’ Over time, creativity days should be opened up to in-

1 Massive open online courses
2 Theoretical and Applied Economics Research Group CNRS and University of Bordeaux research unit
3 Approach to innovation and its management which strives to combine analytical thinking and intuitive thinking
include Master’s students and students in scientific programs.

An emphasis on interdisciplinarity

Another key priority is interdisciplinarity. "We will always need highly-trained specialists, but in my opinion it is essential to approach disciplines from the perspective of important, cross-cutting themes such as ageing or big data," explains Achille Braquelaire. "We’re already doing this at the Institute of Wine and Vine Science, which combines teams dedicated to Oenology, Biology, Economics, Law...as well as in Environment or in Physical and Sporting Activity Sciences and Techniques. Teaching a subject from multiple perspectives often results in outstanding training programs that are considered real gems." An Interdisciplinary Institute, with a shared goal of research and education, is currently in development and at the beginning of the 2016-2017 academic year, the College of Human Sciences is launching "SHS for All," a distance learning program available to all departments. This program will consist of five thematic teaching units on risks, discriminations, ages of life, education, and health, which are approached from the perspectives of Anthropology, Sociology, Educational Science, Psychology and STAPS5. "One of our goals is to help students better choose their paths," explains Sandrine Rui, Director of the College of Human Sciences, where the project was developed. "We would also like to increase the role Human and Social Sciences plays in education, research, and society. Not only do these disciplines help build up important skills, they also contribute to developing personality and citizenship, regardless of career path or educational program. We’re living in a more reflective society which is constantly asking questions about the meaning of individual and collective actions. We cannot afford to do without SHS and risk finding ourselves in social gridlock. In time, additional courses will be developed with other Human and Social Science disciplines at the University of Bordeaux or with partners." Along with these changes in approaches to teaching, according to Marthe-Alaine Jutand’s, the physical organization of universities must also be reconsidered: "New spaces being created, such as the Rolex Learning Center of EPFL in Lausanne, feature a combination of spaces for formal and informal learning. In the future we’ll be able to learn, read, and work in a collaborative way, but also eat and relax in the same space, thus facilitating student/teacher relationships. We live in a time of great change. However, the university must not lose its soul: developing and cultivating citizens."
Video games make you stupid. It’s a well-known fact as Gran and Grandpa always remind us. After all, for crying out loud, these games are to blame for kids being so unruly these days! Well, no, actually that’s not true. This outdated view of the fun, next generation video games is inaccurate, and people are now talking more and more about the benefits of gaming on our cognitive faculties. This makes sense when we consider all of the ways video games stimulate our brains: sensory-motor information – from handling the controls to the wealth of visual and audible information – but also the purely cognitive aspects involved in basic decision-making and puzzle-solving. All of this information – requiring the use of several regions of the brain – must be coordinated. And quickly! This is a true challenge that helps us find our way, think, be creative and – in all circumstances – learn better.

The more we play, the better we get: we “learn” how to play. This growing ability comes from our procedural memory (see the article “The mechanics of knowledge, a well-oiled machine!” page 26). But shooting zombies and setting yourself free during an “escape the room” game also stimulate learning in life, in real life.

### Learning to play, learning through play

Regardless of the type of game, the benefits are there, provided there are reasonable limits: short sessions spread out over the course of the week are advised. “Video games seem to encourage people to stay focused outside of the school context,” explains Jean-Luc Morel, CNRS researcher in neurobiology at IMN². Studies show that “if we test the number of words subjects remember from a list before and after a game session, we observe better results afterwards.” This enhanced memorization could be explained by improved concentration: we focus our attention intensely for a short period of time. In a fun environment, in which an immediate re-
sponse follows each of our actions, it’s child’s play. For Stéphanie Bioulac, child psychiatrist at the University Hospital of Bordeaux and member of the Sanpsy3 unit, this explains the results of her studies on attention deficit disorders with or without hyperactivity (ADHD). This neuro-developmental disorder, a combination of attention deficits, impulsiveness and sometimes hyperactivity currently affects 5% of school age children. What really struck Stéphanie Bioulac was what parents told her: their children were able to play in front of the screen for hours. She then compared the scores of children with ADHD with the scores of other children for video games that require ongoing attention. The results: no significant differences. “In this situation, the players with ADHD succeed in using their learning abilities,” explains Stéphanie Bioulac. The fun aspect thus compensates for the attention deficit. The challenge would therefore be to use video games as educational resources, and even use them for cognitive remediation: using games to rehabilitate the child’s impaired cognitive functions. These specific types of software have a name: serious games.

Join the game

What’s a serious game? It’s a software program that uses entertainment for educational purposes. The educational content is integrated into fun video mechanisms, becoming tools for learning, a concept called gamification. For French people, Adibou may come to mind, the top educational game from the 1990s that offered academic help to young schoolchildren. Today the concept has expanded to all areas, such as healthcare applications created by Jérôme Leleu, a master builder on Minecraft® (with his 9-year-old son), and the president of Interaction Healthcare, a digital technology agency specialized in healthcare and the design of serious games. The game Theo and the psorianauts, for example, allows a child with psoriasis, an inflammatory skin disease, to virtually learn how to handle this illness on a daily basis, from the family dinnertime to swimming lessons. In this case, the serious game is less educational and more therapeutic. For ADHD, this concept currently represents a virtually untapped potential that is worth exploring. Another project Interaction Healthcare is working on: the MedicActiv healthcare training platform. The currently expanding initiative pools virtual clinical cases. “Whether it’s for doctors, students or teachers, gamification can communicate a message more simply,” Jérôme Leleu explains. They can practice clinical reasoning with patients made of pixels. This dream is becoming a reality thanks to contributions from the university hospital and the University of Bordeaux – for the medical and educational content – and from INRIA® – in modelling the human heart. Learning through courses, learning how to provide treatment, learning how to cope with a disease... This is only a small sample of the expectations serious games are seeking to meet, so “game over” is a long way off! ■ YF

“Video games seem to encourage people to stay focused outside of the school context”

Jean-Luc Morel

Sommeil, attention et neuropsychiatrie, (Sleep, attention and neuropsychiatry) a CNRS and University of Bordeaux Unit

Game in which players manage their resources to build constructions

Institut national de recherche en informatique et en automatique (National Institute for Research in Computer Science and Automation)

A child with psoriasis virtually learns how to live with his illness on a daily basis

© SimforHealth
Since the law was passed in 2013 to reform the school system, ESPEs have been created to train teachers and principal education advisers by awarding the Master’s degree in teaching professions, education and training (MEEF). This challenging field of study addresses the fundamental issues of national education. Organized into alternations between internships and professional training, the MEEF Master’s program lasts two years. A competitive recruitment examination at the end of the first year grants passing students the status of “probationary official”. They then spend the second year alternating between a part-time internship, in charge of one or several classes, and training to assist them in their professionalization. The content is adapted to the needs of each student in addition to the core curriculum that enables a shared professional culture to be established among all levels of education. Reflective research work is carried out based on the issues present in the specific internship. Our students’ major concern is directly connected to the needs of the pupils they will be responsible for throughout their careers.

A variety of methods contributing to the success of every pupil

These questions are at the heart of the training that is provided. The content covered over the course of these two years is centered on the teaching for the given subject, subject teaching methods, the setting of the teaching profession, a modern language, a digital educational project, a research unit. These should all contribute to obtaining the skills needed to teach and thus contribute to the success of each and every pupil. Knowledge about the subject matter to be taught, and about pupils and their learning environment, is critical to success. When it comes to learning processes, while there are different important aspects to take into account, it is essential to differentiate between what is developed, what is educated and what is learned, so that each individual can define his or her own

By Jacques Mikulovic, Director of the Academy of Bordeaux’s ESPE (l’Ecole supérieure du professorat et de l’éducation – Advanced School of Teaching and Education).
way of teaching. All teaching methods can be appropriate, yet they are more or less efficient depending on the time and the meaning they provide for each pupil, the meaning based on each individual’s experience. Thus a teaching method involving a game can enable beginners to enter the learning process more easily, whereas problem questions or more systematic forms of learning are methods that can be used for pupils who have entered a more reflective phase.

**Learning about diversity to adapt teaching methods**

The objective of this Master’s is therefore to allow students to gain experience from being with pupils of varying levels and profiles, so that they are able to take diversity into account, the richness and unique aspect of every child and adolescent, and so that they themselves can test different pedagogical approaches. A major challenge for teachers is to provide meaning to learning and knowledge, so they become useful representations for the pupils.

As a result, we must succeed in training future teachers who are capable of experimenting, making assessments, and even reconsidering the way they do things by cultivating their ability to challenge themselves. In the context of a research approach, they must be capable of producing the keys to understanding the measures they put in place. Considering pupils’ new connection to knowledge, the model whereby a teacher is gifted with exclusive academic knowledge, with a focus on top-down transmission, has now more than ever become a thing of the past. Transmission is crucial, yet it must be done through the prism of each pupils’ experiences and qualities.

It is also important to integrate digital technology into the Master’s program, not only to avoid creating inequalities in pupils’ connection with digital technology, but also to highlight how they use this technology, making it a true subject for learning and education.

**Educating for free will**

We must be vigilant in ensuring that the teachers we train educate their pupils to maintain their freedom of will, and that beyond the learning context, they are able to decode information and put it into perspective. At the same time, our school must be a place where teachers receive lifelong support to train pupils that have not only acquired general knowledge, but also capacities in their relationships with others and social skills for living and interacting with others.

We must offer training that does not instill a sense of certainty, but rather enables doubt to creep in. In the words of André Gide, “a thirst for knowledge is born out of doubt, stop believing and start learning”. We must always contribute to improving our systems for learning.
“Learn better to better succeed,” this is the objective of the middle school reform that came into effect in France at the start of this 2016 school year. This reform simultaneously affects the educational programs, teaching practices, and educational organization. An enormous challenge explained by two education professionals.

Greater educational autonomy, an increased capacity to adapt to students’ needs, more collective and interdisciplinary work, further openness to the world today. A better acquisition of fundamental knowledge, redesigned academic cycles to optimize this acquisition of a common foundation of knowledge, skills and culture, taking diverse profiles into account... Middle schools have embarked on a comprehensive reconstruction process aimed at ensuring that every child has the means to learn and progress.

A necessary reform?

“The middle school years are the hardest for students. Failure is more frequent. Among some students, we even see a loss of knowledge between sixth and ninth grade,” explains Marie Pierre Lallement. “And this is not purely the institution’s fault, the reasons are multifactorial,” adds the teacher who believes this reform came at the right time. Erick Roser agrees: “In France, more than in other countries, social and regional components amplify the disparities; what is at stake in this reform is the restoration of the educational system’s performance, by ensuring the success of the largest possible group of students. This thorough reform is consistent with the nation’s expectations for its schools.”

An innovative reform?

So, what’s new about this reform? The reform represents what in education jargon is referred to as a curricular approach. In other words, it encompasses all the educational practices: the curriculum, what the students must learn, the teaching methods and how students are assessed. “It is the first time a reform will affect all areas at once,” explains Erick Roser. Up to now, we had tried introducing different approaches – support for students, interdisciplinarity, etc. – but separately. Now we are building on the totality of the simultaneous actions and we are stressing the fact that all students will benefit from the reform.”

From her perspective as a sixth grade teacher, Marie Pierre Lallement sees many changes that must
The reform of middle schools announced in the spring of 2015 by Najat Vallaud-Belkacem, Minister for Education, Higher Education and Research, is one of the iconic measures of President Hollande’s term of office — following on from the debate concerning primary school hours. It has now come into effect in over 7,000 establishments in France, but not without controversy. Having caused a stir among teachers’ unions and parents’ associations, it has provoked multiple strikes and continues to be the subject of much debate and criticism in terms of both ideology and teaching methods. While the government advances the argument of opening up to other skills, some opponents consider that the reform undermines the basics of education, and others criticise it for giving excessive autonomy to the schools themselves. The executive, meanwhile, maintains that the reform will bring flexibility in the day-to-day operations of schools, thereby enabling them to adapt more effectively to the different needs of their pupils…

be applied in terms of both content and style: the revised curriculum and foundations, generalized collective work, the increased educational freedom… “All of these new aspects will need to be integrated, which will create significant pressure for teachers, even though the middle school reform is necessary for everyone,” she admits.

A constructive reform?

“The project is unquestionably ambitious and demanding. Our middle schools of the future will reflect this desire to generalize collective and collaborative work by favoring interdisciplinarity and by supporting all children individually, whether or not they are struggling. Based on the principle that each student is able to learn and progress, but not at the same pace, this reform offers a positive assessment system that measures the potential for improvement for a full cycle, no longer for just a year,” explains Erick Roser. On paper, it’s a constructive change.

Marie Pierre Lallement also stresses the importance of redesigning the cycles, an initiative that will enable progressive work to be carried out over the 3-year period. “This is particularly true for cycle 3 – fourth, fifth, sixth grade – which is called the consolidation cycle. The continuity of learning between elementary and secondary school is therefore guaranteed for students and for teachers, contributing to the promotion of a common culture, and ensuring a better transition between elementary and middle school,” she explains.

In her opinion, another strength of this reform is the interactions that will take place between teachers working as a team: “The practical interdisciplin ary teachings reinforce the meaning of the learning for students and ensure consistency for teachers. But there will need to be a framework…” adds Marie Pierre Lallement. While this reform relies heavily on the trust that is placed in teachers, who will now, like the institutions, have greater autonomy, their professional skills will need to be developed by providing them with continuing education. “We are working for the long-term,” concludes Erick Roser.”

© yanlev - Fotolia

U the University of Bordeaux magazine #6
The role of apprenticeship training in higher education is starting to come into its own, little by little. Often seen as a default vocational path and erroneously, this type of training is nevertheless becoming one of the most efficient methods for professional integration. Let’s take a closer look.

Apprentice Generation

A road to nowhere? While misconceptions about apprenticeship have been harsh, they are becoming less and less common. Combining professional on-site training within companies, along with learning in an apprenticeship training center (the famous CFA training centers), apprenticeship training is acclaimed by employers and the diplomas are identical to those awarded in traditional higher education programs. Apprenticeship is no longer synonymous with the French CAP1 and BEP² training alone. Originally designed for young people struggling with the educational system, beginning in middle or high school, it allowed them to be more active. Today, apprenticeship training is slowly gaining popularity among all levels of higher education, from BTS³ training and DUT⁴ programs, to bachelor’s and professional master’s degrees, and is particularly popular in engineering schools.

Among universities, the first apprenticeship groups date back to roughly twenty years ago. However, as David Reungoat, professor researcher at the Institute of Mechanics and Engineering (I2M) and director of the Centre for Apprenticeship Training for Science and Technology Professions at the University of Bordeaux explains, “We suffer from a two-fold image issue. On the one hand, apprenticeship is generally – and erroneously – seen as training that is not very attractive. On the other hand, for some, university education seems too advanced and sci-

---

1 Certificat d’aptitude professionnelle/ Certificate of Professional Skills
2 Brevet d’études professionnelles/ Diploma of Professional Studies
3 Brevet de technicien supérieur / Advanced Technician Diploma
4 Diplôme universitaire de technologie/ University Diploma in Technology

---

Source: MENESR-DEPP, SIFA (système d’information de la formation des apprentis/ Apprenticeship Training Information System).

---
Learning in immersion

A continuation of the very ancient compagnonnage mentoring tradition, apprenticeship training was established in France in the 1920s. The objective was to transfer knowledge through actions and immersion. Today, this philosophy remains intact. "We learn a trade with the apprenticeship master, the same term is still used. This reflects the rather paternalistic aspect of this type of training," notes David Reungoat. He insightfully remarks that the university is the first place where, without realizing it, apprenticeships were already taking place. "What are medical internships? Or doctoral theses? Learning through actions and immersion is therefore apprenticeship training! Although this comparison had not been made before, we are now in the process of building that link. Developing apprenticeship training is a strategic mission for the University of Bordeaux. Every year we open apprenticeship trainings for new subject areas, to ensure the coverage of as many disciplines as possible, particularly in the field of human and social sciences," he explains. As a result, this dynamic strengthens the link between companies and the university, which is another important development. "I can only see advantages to this," affirms David Reungoat. "There are more and more exchanges between these two worlds, and the situation benefits everyone. I really love teaching apprentices, it’s like having the company come to the university."

A path of excellence that leads to employment

Apprenticeship trainings are carried out by university teaching staff (in separate groups or mixed with traditional higher education programs) and guarantee the scientific quality of the diploma, in addition to providing work experience. This type of training gives young people a practical route for gaining both theoretical knowledge and the practical skills that are required for mastering a profession, understanding the company, and acquiring essential expertise, thus increasing their ability to quickly integrate a work environment. The result: 93% pass the exams and professional integration is optimum.

Jacky Niort, in charge of support innovations and customer services for the military at the Thalès site in Bordeaux, and a part-time lecturer at IMA (Institut de maintenance aéronautique – Institute of Aeronautical maintenance) was one of the first to host apprentices in his department. He is convinced by the system. "Apprenticeship training allows young people to integrate an ecosystem and obtain a clearly defined status. It breaks down barriers and accelerates maturity and therefore efficiency. For the company, it represents a pool of potential recruits, a gentle way of testing the apprentices’ job skills."

There is no doubt that there is a bright future for apprenticeship training. In the coming years, this fast-developing system will need to expand more and more, especially since the government is increasingly encouraging companies to take on apprentices. 

---

5 SME: Small and medium-sized companies

---

7 in 10 young people find a job at the end of apprenticeship training
Observe a miniature train moving thanks to levitation. Make – and taste! – a molecular cuisine cocktail. Create papyrus scrolls, or design a city projected in augmented reality on a simple piece of paper... Many strange and fascinating experiences, as entertaining as they are educational, are offered in the context of the Bordeaux scientific circuit program. This scientific mediation event takes place during the science festival, la Fête de la science: a national event aimed at promoting scientific research, from chemistry to economics, maths to philosophy, to a wide audience.

But what exactly is “scientific mediation”? Simply put, it is the act of transferring scientific knowledge outside of the academic context, adapting it to the target audience. Or, how to magically open the key to computer codes, chemical formulae, economic concepts and other glorious monstrosities. This challenge requires language to be more or less popularized – simplified to make it comprehensible – and fun methods to be used. Inventiveness is the key word, and there are sure to be ideas buzzing around that will make you enjoy science all year long! Some examples: The European Night of Researchers offers the general public the opportunity to meet scientists one by one, turning speed-dating into speed-researching. My Thesis in 180 Seconds challenges PhD students to present their work to the general public in no more than 3 minutes please! At the same time, high school and middle school students cultivate piles of salt in hope of creating the most beautiful crystals to win the Cultivate Your Crystals competition. The most motivated learners will start one-year research projects as part of the Apprentice Researchers program.

Give the taste of science by giving flavor to science

The Bordeaux Scientific Circuit is also full of creativity, with around sixty workshops – experiments, conferences, tours – on offer for school classes right inside the campus research laboratories and centers. Here, learning means discovering, practicing and having fun: it is a winning formula for breaking down barriers to science – 2,600 visitors participated in the 18th edition in 2016 – and bringing hidden interests to life. "This is an exceptional window to the world of science for schoolchildren, which sparks vocations and confirms passions," explains Mireille Frimigacci. The HSE
engineer with ENSCPB, an engineering school for chemistry, biology and physics, is one of the founders of the event that began 19 years ago. Her school, and all the Bordeaux institutions that coordinate the project — universities, CNRS, INRIA, INRA, and engineering schools with support from the Local Education Authority and Cap Sciences — have two objectives: cultivate a strong interest in science, a science culture among young people and, at the same time, inspire them to become future students and researchers. This second objective is directly aimed at elementary, middle and high school students.

The practice of transferring knowledge is an integral part of their mission, leading them to summarize their knowledge. So has this goal been met? "The feedback is very positive," says Vincent Besnard, artistic and cultural education assistant at the Local Education Authority. It is rare to have teachers who do not come back with their class from one year to the next, like Joëlle Vincent-Gorlier, Earth and Life Science teacher at Collège Léon Testut. For three years now, around forty of her ninth grade students take a bus from Beaumont, a remote village in the Périgord countryside. Can you guess their destination? The Circuit’s chemistry and prehistory workshops. There they can discover material otherwise inaccessible at their institution, and get a chance to touch bones, skulls, and other relics from the past. What’s more, “it motivates them to work in class and gives them a glimpse of what they could do later in life,” their teacher explains. The students set out to discover Lascaux, their heads full of concepts of evolution, taking with them an idea of research they acquired in situ.

The Circuit is fertile ground for young sprouts hungry for knowledge to grow in vitro… but it’s more than that. “The workshop on algorithms helped me to see my course from a different perspective, one that was unfamiliar to me,” explains Vincent Besnard, who was able to experience the workshop with his students as a physics teacher. The workshops are educational tools, but also the opportunity to enhance teachers’ cultural knowledge. It is also an opportunity for them to discover the research being carried out in their subject area. Some even sign up for the teacher program in the labs to receive training on new techniques or participate in trainings offered by the science center la Maison pour la Science to expand their knowledge.

In music, a tempo means “return to the initial rhythm”. In fact, this is precisely what scientific mediation is. Far from the fortissimo of the classroom, it is a return to the adagio that sets the pace for our dreaming minds, as we open up to knowledge. ■ YF

There are two objectives: cultivate a strong interest in science, a science culture among young people and, at the same time, inspire them to become future students and researchers.
32
“Best of” exhibition, the Museum of Ethnography tells its story

36
What is a color?

38
Science, sometimes (just) a fortunate coincidence

40
Can we limit the impact of pesticides?
“BEST OF” exhibition, the Museum of Ethnography tells its story

“Being and appearing” window
Accessories and clothes including a dress made of fish skin collected by André Leroi-Gourhan (20th century, Siberia)
The University of Bordeaux Museum of Ethnography is revealing its secrets in an exhibition offering visitors a selection of the archives and works in its collections. These humble, curious, or sumptuous objects collected from around the world evoke the history and missions of this hundred-year-old institution. A behind-the-scenes look at this unique exhibition, from design to construction.
Object selection

For the "Best Of" exhibition Solenn Nieto and Gaëlle Cartault, who are in charge of collections and archives, have selected 180 objects out of some 5,000 included in the museum’s collection. These objects from Africa, Oceania, Asia, and the Americas illustrate the daily life of indigenous populations. They are skillfully classified in dedicated storage spaces and must be handled with great care.

Museum display

The display layout, designed in collaboration with the firm Art Concept services, consists of several non-linear circuits so visitors may choose their own path. Careful consideration was given to the display of each piece.
Construction and assembly

Twenty showcases were specially built and assembled by four people over a period of fifteen days. Most of the objects are presented under glass in order to avoid dust and thermal shock and light was carefully controlled as well. All objects on bases were placed on chemically-neutral materials to prevent damage.

Opening and bringing to light

Two years of preparation for two years of exhibition. This “Best of” exhibition provides a chance to explore a rich overview of objects that contribute to the wealth of this university museum’s collection and as well as to understand the challenges of ethnographic collecting. It is also an opportunity to come face-to-face with surprising masks, spoon, decorative accessories or enigmatic objects, symbols of cultural practices which in some cases no longer exist...

Masks (male and female)
Democratic Republic of Congo
Songye population, 20th century
What is a color?

Physical aspect

Without light, no color

Source of white light

Light is made up of waves

Set of all visible colors, rainbow colors

Without light, no color

Biological Aspect

Emitters

Without light, no color

3 types de cones: for blue, red and green

Everyone has cones in slightly different proportions. So there is no “normal” vision.

What if we break down white light?

White light

Prism

It’s the same principle for rainbows!

White light

Drop of water

The drops of water break down the light.

What if we change our light source?

Red light

Red reflected

The lemon is seen red

Red light

Absorbs blue

The lemon is seen black

The perceived color depends on the light source.

What if the cones turn into ‘cone-nots’?

Color blindness (deuteranomaly)

(total color blindness)

congenital achromatopsia

Everyone has cones in slightly different proportions. So there is no “normal” vision.

© Written by: Yoann Frontout & Delphine Charles – Graphic design: Sylvie Dubroca

Understanding the University of Bordeaux magazine #6
A seemingly insignificant question of appearance which is actually as subjective as it is complex. “It’s green.” “No, it’s yellow.” “Yes it is, olive green!” “No, it’s mustard yellow!” It’s enough to make you see red, as it were…Don’t panic: light waves as interpreted by our brain, an explanation of a colorful phenomenon, which is both physical and psychological!

Would you be able to name them?
Yellow...

1 amber - 2 maize - 3 Naples yellow - 4 butter - 5 aureolin - 6 golden yellow - 7 chartreuse yellow - 8 jasmine

---

**Psychological aspect**

**INTERPRETATION**

- **Red and green react to waves reflected from the lemon**
- **The color of the iris is mainly due to melanin. No link with the cones.**
- **nerve message**
- **visual interpretation of message…**
- **it is yellow!**
- **+ or - rich vocabulary**
- **+ or - similar vocabulary**
- **millions of shades perceived but just a few dozen categories to name them and... depending your learning**

---

**What if your eyes fool you?**

Here, all the circles are pink. Eyes do not perceive only the color of an object but also the colors and shapes which surround it, making the illusion.

---

**What if colors were mainly related...**

...to emotions
- tickled pink
- being yellow (cowardly)
- seeing red
- green with envy
- feeling blue

...to cultures
- Childhood fashion or sexism?
- Sport
- Marriage
- Celebrations

---

**Special thanks to**

- **Sandrine Delord**, a research professor in Psychology and Cognitive Neuropsychology at the psychological laboratory of the University of Bordeaux
- **Jérémy Leconte**, a researcher at the Bordeaux Astrophysics Laboratory (CNRS and University of Bordeaux unit)

---

© Written by: Yoann Frontout & Delphine Charles – Graphic design: Sylvie Dubroca
Like Monsieur Jourdain who spoke in prose without knowing it in Molière’s Bourgeois Gentilhomme, researchers sometimes use serendipity without realizing it. This English term describes a chance accident that leads to results one could not have imagined at the outset. Some examples below.

What do aspartame, Teflon, super glue, Coca-Cola, microwaves and X-rays have in common? They were all discovered by serendipity. This concept has become quite fashionable today but the word was invented as early as 1754, by an English politician and man of letters, Horace Walpole. He was inspired, like Voltaire for Zadig, by a Persian fable, Voyages and Adventures of the Three Princes of Serendip to coin a word that expresses unexpected discoveries made by accident, but also sagacity. The word serendipity then lay dormant for decades before being introduced in common American language after 1940. The word would only appear in France in the 1980s. Difficult to translate, the word is sometimes explained as a fortunate accident, or a surprise that leads to a creation. In 1973 the Quebec French Language Office defined it as “finding something when you are looking for something else.” In the French language, the word has become a neologism attributed to the scientific world. Indeed, who looks for things more on a daily basis than researchers? Several famous examples of serendipity have occurred in the field of medicine, including the discovery of penicillin, and of Viagra, which was originally a medication used to combat hypertension.

It was by chance that Dr. Christine Léauté-Labrèze from the Pediatric Dermatology department of the Bordeaux University Hospital Center, gave a second life to a medication. In 2007 she and her colleagues were treating a newborn suffering from a very large hemangioma on her nose. Usually this small red tumor, which is benign, will disappear and disappear by itself, but sometimes, in the most serious cases, it grows to cover babies’ faces and impairs their vision and breathing. Since there was no specific treatment, physicians administered cortisone. However, secondary effects can sometimes include heart problems, which the cardiologist chose to treat with a drug that had been around for 50 years: propranolol.

Knowing how to observe

The next day the hemangioma had shrunk dramatically. This was a great surprise for the dermatologists, who replicated the experiment a few days later on another newborn suffering from the same complications: the effect was identical. For the medical team, it was not a question of chance. After a
Penitentes have “grown” on the Chajnantor plateau in the Chilean Andes, across from the Licancabur volcano.

Understand

few years of further studies they were able to apply for a patent, in particular with the University Hospital Center and the University of Bordeaux. The patent has since been transformed into one of only a few medications reserved for children, Hemangiol. “A single observation on a patient was able to replace 10 to 15 years of research to find a specific treatment for this disease,” explains Christine Léauté-Labrèze. A perfect example of a surprise leading to a creation for this doctor, who admitted to only discovering the word serendipity during this experience.

Gérard Vignoles, a University of Bordeaux professor and Director of the Thermostuctural Composites Laboratory (LCTS), had a similar experience. This specialist in Physico-Chemical Modeling of Materials, particularly for aeronautics, found himself the co-writer of a scientific article in 2015 explaining the formation of... penitentes.

When it comes to serendipity, nothing is left to chance

Thousands of miles from his laboratory and his research, these odd ice structures “grow” on arid summits such as those found in the Chilean Andes. They are named for their resemblance to a procession of monks in penance, enrobed in white, who would lean and prostrate themselves in the same direction. In 2006, researchers from French and American teams had tried to explain their formation through the phenomenon of sublimation. This means that the layer of ice or snow transitions directly from a solid state to a gaseous state, under the effect of the heat, without going through a liquid phase. But these studies did not explain the regular spacing and size of the penitentes, which can measure up to a meter high. This is where Gérard Vignoles came in. He was studying the consequences of atmospheric entry on heat shields protecting spacecrafts. Due to extreme heat, the surface of the materials, which is originally flat, becomes indented with regular cavities through sublimation and therefore gets rough. The rougher it becomes, the more the received heat flux increases, and the faster the materials deteriorate. Since the scientist could not successfully model these phenomena, he sought out a natural model in order to better understand and control them. This is how, along with his colleagues at the Morphogenesis Laboratory of ESPCI, he ended up studying penitentes, which are, as he puts it, “an exaggerated version of the effects of heat shields.”

In modeling the formation of penitentes, the research team has not yet resolved the problem of spacecrafts, even if it did help them make progress. They did, however, discover the secret of the formation of penitentes, which depends on the difference in temperature under and at the surface of the ice, as well as the thickness of the wet layer under it. This fortunate foray will undoubtedly be a side story in Gérard Vignoles’s biography. But it does prove, once again, that when it comes to serendipity, as Pasteur once said, “Chance favors the prepared mind.”

“Penitentes, are “an exaggerated version” of the effects of heat shields.”
Gérard Vignoles

1 Research unit affiliated with CNRS, University of Bordeaux, the Safran group and the CEA
2 Industrial physics and chemistry engineering school in Paris (ESPCI)
They are everywhere. On our plates, in our tap water, the air we breathe, our cleaning products, our gardens, mosquito-repelling diffusers, certain treated clothing and even paint. Pesticides are now a part of daily life. “We use dozens, or even hundreds of different products in every aspect of our lives,” warns Hélène Budzinski, who is in charge of the Laboratory of Physico- and Toxico-Chemistry of the Environment team (LPTC) at the Laboratory of Oceanic and Continental Environments and Paleoenvironments (EPOC) in Talence.* We are faced with a skyrocketing number of molecules, which far exceeds agricultural use. And research has shown widespread pollution, due to multi-compounds from all parts of the environment.” This is why pesticides are such a headache. Invented for our comfort, to combat disease or increase agricultural productivity, these compounds are used precisely because they are toxic and resistant. The impact on the environment is therefore not really surprising, but it’s difficult to imagine turning back since the entire system seems to be reliant on chemicals. France is one of the largest pesticide users in the world, consuming more than 60,000 tons of these products in 2014 (9% more than in 2013). “The major challenge of our work lies in showing that we can limit the effects of these products by changing how we use them, through rationalizing the number of molecules available on the market, and reducing their toxicity,” adds the researcher.

**New monitoring tools**

Hélène Budzinski has been interested in pollutants for a long time. In 2006, oyster farmers in the Arcachon Bay bore the brunt of a crisis which was first thought to be ecological: toxic algae developed, killing oysters, decreasing spat collection, and diminishing eelgrass beds... the entire ecosystem suffered. For the first time large-scale research was initiated on the permeation of pesticides in the area. “The difficulty with these molecules is being able to detect them, because they are extremely diluted in the water,” explains Hélène Budzinski. “When laboratories carried out routine samples,
they did not find them. We therefore developed specific techniques for expanding the range of detection to measure concentrations in nanograms/liter whereas traditional laboratories were not able to go below micrograms/liter.” To track the molecules, Hélène Budzinski’s team developed passive samplers. How do they work? Discs submerged in the Bay for several days will act like sponges and trap polluting substances that accumulate in their membranes. “Recording results over a period of time is more representative than a spot sample and enables us to measure the quantity of pesticides to which the environment is really exposed,” says the researcher. These preliminary studies revealed the presence of several molecules including Irgarol 1051, which is used in antifouling paints and whose purpose is to prevent microalgae from clinging to ship hulls. “Unfortunately current scientific knowledge cannot establish a direct causal link between the effect of Irgarol and the disappearance of algae in the Bay,” says the researcher. “However, its presence in the environment was seen as a cause for concern and the Siba (Intercommunal organization of the Arcachon Bay) initiated an awareness campaign for professionals and oyster farmers on the use of this type of paint.” Three years later, concentrations recorded were 4 or 5 times lower. This proves that more responsible use can reduce the impact of pesticides.

**Widespread Fipronil pollution**

Using passive samplers, the team also revealed the presence of another molecule in the Garonne and in the Bay: Fipronil. Blamed for the disappearance of bees, this pesticide has been banned for use in treating corn seeds by the European Commission since 2013. However, it is still authorized for domestic use in killing termites, ticks, or cockroaches. “Measurements we carried out on water treatment plants outflow revealed that Fipronil reaches an alarming concentration of 50 nanograms/liter, while the toxicity threshold for this molecule is only 0.77 nanograms/liter,” explains Justine Cruz, who has just completed her PhD on these new tools. “We were able to deduce the concentration level in the Gironde (approximately 100 times less) and develop a specific detection method. Comparing the concentration levels between a plant’s inflow and outflow also revealed that treatment techniques used by these plants are completely ineffective against pesticides, because they were not designed for this purpose.” Even more troubling is the fact that Fipronil is a very stable molecule, which will re-

“The major challenge of our work lies in showing that we can limit the effects of these products by changing how we use them, through rationalizing the number of molecules available on the market, and reducing their toxicity.”
main present in the environment for several days, or even several weeks, before being transformed into metabolites which are just as toxic. In all, a hundred treatment plants throughout the territory were tested, in partnership with the ONEMA (National Office of Aquatic Environments). The result: there is Fipronil in 80% of the plants. “It is definitely a widespread phenomenon, but the component has not yet been added to the watch list, which is determined at European level,” adds Hélène Budzinski. “We are working on complementary studies in order to identify the source of Fipronil and develop measures for managing it. The next step is to clarify the question of degradation products. As even if plants improve treatment methods, we must still manage the toxicity of the metabolites.”

Reconsidering economic models

In the Blayais-Côtes de Bordeaux wine region on the right bank of the Gironde, Hélène Budzinski’s team, in collaboration with some ten other LabEx COTE teams, has just begun work on a large on-site study to understand the processes of transfer, contamination and the impact of pesticides from wine-growing agro-ecosystems on different natural environments (soils, Gironde estuary, etc.) Codename PhytoCOTE. Combining Agronomy, Environmental Chemistry, Hydrobiology, Ecology, Ecotoxicology, and Socio-economics, a multidisciplinary team, led by Francis Macary (Irs-tea), will work closely with wine producers in order to identify different scenarios for changing their practices along with their economic and environmental consequences. This ambitious project, funded through LabEx COTE and co-funded by the Nouvelle Aquitaine region, is the result of 15 years of expertise. What products are used? Are they transferred? Do they degrade completely in order to be mineralized in the soil or are they transformed? Is there an impact on the functioning of the soil itself, or on the aquatic environment? Does the slope of the ground have an effect? This data will help identify new and more sustainable cultivation practices. A critical issue. JZ

Farmers, the first victims of pesticides

In France, over a million farmers work in fields, vines, orchards, or plantations treated with pesticides. Since the 1980s, epidemiological investigations have pointed to the role certain pesticides play in the development of cancer, reproductive problems, or central nervous system diseases in these populations of workers. Isabelle Baldi, a Physician-Epidemiologist at the Bordeaux Population Health Center (INSERM and university of Bordeaux, Epicene team) has been studying these questions for 20 years. “Studies on workers’ exposure are crucial to understanding the effects of pesticides on health and in optimizing the use of these products in order to reduce their effects on humans,” explains the researcher.

“For example, our studies and those of other teams have demonstrated that dermal exposure is the primary way workers are exposed to pesticides, which not all users understand. Some of them wear masks but work bare-handed. The choice of equipment, organization of work, or type of protective clothing worn represent some ways for reducing exposure.” This year Isabelle Baldi’s and Hélène Budzinski’s teams are working together on a project concerning apple orchards, funded by IdEx. “Teams from the EPOC Laboratory will analyze levels of contamination inside tractors, on the ground, and on leaves of trees, while we will explore workers’ exposure,” says the researcher. “Much should be learned by comparing these two types of information. We can work on changing practices, but the very toxicity of these products must also be changed.”
44
Universities coming to the aid of secularism

47
A Californian in Bordeaux

48
“Les Vendanges du Savoir”: a refined blend
In January 2015, the University of Bordeaux launched a "Law, Society, and Religion" university degree program. A much-needed return to the fundamentals of the law of 1905.

First there was the 2004 law forbidding religious symbols in public schools for all students. Then came a ban on burqas in public places in 2010, when, for the first time the street was legally defined as a "public place." Then there was the Baby-Loup affair involving a childcare worker who was laid off by the private, associative daycare center where she worked for refusing to take off her Islamic headscarf. "For about fifteen years now, we’ve been seeing rising tensions in society about secularism, from both believers and non-believers," observes Bénédicte Lavaud-Legendre, a legal expert in charge of CNRS research at Comptrasec*.

Encouraging intercultural dialogue

"Current tensions are created by uncertainties around this framework, because the notion of secularism is undergoing such profound changes that the term ‘new secularism’ is now being used." Indeed, secularism’s reach is continually expanding, progressively transferring the requirement for neutrality of the State to its citizens, institutions and State representatives, to public places and all its inhabitants.

To accompany this movement, which has given rise to a great deal of misunderstanding, the University of Bordeaux launched a University Diploma (DU) in

* Center for Comparative Labor and Social Security Law (CNRS and University of Bordeaux unit)
“Law, Society, and Religion” in January 2015. “As fate would have it, we began the courses a week after the Charlie Hebdo attacks,” continues Bénédicte Lavaud-Legendre, who is in charge of curriculum for this program. “Two evenings a week, over a period of six months, prison administration staff, imams, an elected city council member, a school internship manager, and prefect representatives gathered on university benches to debate the idea of secularism. An array of issues were addressed, including sociology of religions, a comparative approach to secularism, Israel and countries of the Arab world, studies of implications of the law of 1905 on labor, family, and criminal law... In all, some ten universities have chosen to start a similar DU within two years. A distinguishing feature of the Bordeaux program is that it involves religious leaders from the three major religions. This is a real plus for Soufyane Lakred, the former imam of Grand-Parc Mosque in Bordeaux, and a participant in the 2016 program. “The great diversity of the class provided a valuable learning experience. I even attended a conference given by a priest devoted to the theme ‘Must we be afraid of Islam?’ after being invited by a participant in the DU. Were it not for this program, I would never have encountered this person. The majority of believers have little knowledge of secularism because the idea does not exist in their native countries. Some of them think it limits their religion, but I try to explain that it’s just the opposite: secularism protects their religion. To continue my efforts, I’ve just created an association whose missions will include fighting against radicalization.”

State neutrality and freedom of conscience

It is necessary to go back to the fundamentals of the law of 1905. According to Bénédicte Lavaud-Legendre, this is crucial to making intelligent decisions, with respect for people. “I’m rather skeptical about the current situation which tries to relegate religion to the private sphere at all costs,” states the legal expert. In the text of 1905, the first two articles guaranteed the State’s religious neutrality and the freedom of conscience, combined with the freedom for everyone to practice the religion of their choice, subject only to democratically-defined public order. In the classroom, everyone shares their own real-life situations in which law and religion have clashed. Marie-José Spavone, a technical advisor on social work for the Department, and a participant in the 2016 pro-
gram, worked with the PMI (Maternal and Child Protection) for many years on authorizations for childcare providers in which the question of religion often comes up. "I came across very different cases," says the advisor. "One person had set up an altar to the Virgin Mary in her garden, another had refused to take off her headscarf or take the children to the park because she was not allowed to leave the house..." In accordance with the law of 1905, childcare providers do not have a neutrality requirement because they are not civil servants. "However, religion does sometimes reveal people's rigid behavior, which can be problematic in caring for children," continues Marie-José Spavone. "These concrete examples led me to participate in this training program, which has expanded my thinking about ethical issues as well as given me a glimpse of the complexity of religious issues."

School also seems to act as a catalyst for much tension revolving around secularism. Must a special school lunch be provided on days when pork is served? Should long, black skirts be banned? Should students be exempt from sport during the month of Ramadan? ‘As for the issue of skirts and religious symbols, we are increasingly preventing young people from expressing their convictions,’ observes Bénédicte Lavaud-Legendre. ‘We’re asking them to leave their convictions at the school door. This makes no sense on a psychological level. Quite the contrary: they need to debate them. There is no reason why the issue should be taboo; but I do think it is essential to establish rules in advance. For once assertions emerge, they may quickly turn into personal conflicts. And it’s the same thing for the cafeteria. The answer that a single menu exists because it’s too complicated or costly does not comply with the law of 1905, because the neutrality requirement is not imposed upon users. Instead, it’s in our interest to seek solutions that satisfy everyone. When we try too hard to confine religion to private space, it ends up coming out in a much more violent way because we are infringing upon a very intimate part of personal identity."
For fourteen years Professors Sébastien Lecommandoux and Timothy Deming have shared a common interest in a vast area of study and research: Polymer Chemistry, and biopolymers in particular. Sébastien Lecommandoux is the Director of LCPO at the University of Bordeaux, and Timothy Deming is a globally-renowned specialist on the subject at the equally-renowned University of California in Los Angeles (UCLA). Their successful partnership first began in 2002 during a seminar to which Sébastien Lecommandoux had invited his American counterpart, who, at the time was on a sabbatical year at the Institut Curie in Paris. A lucky coincidence. Since then, the two scientists’ perfectly complementary fields of expertise have continually intersected and become interwoven in one way or another. So much so that the joint projects undertaken by their two laboratories have now made considerable progress. This latest six-month stay has greatly contributed to the success.

**Strengthening scientific cooperation between the United States and France**

Timothy Deming was given the opportunity to come work in Bordeaux these last six months after being named Fulbright-Tocqueville Distinguished Chair. This prestigious program for scientific cooperation and exchange, in which French and American governments participate, allows one or two French universities a year to host a prominent American research professor for one or two semesters. This was a golden opportunity for the University of Bordeaux and the LCPO. Their joint research strives to develop biopolymers for use in medical applications and diagnostics (tissue regeneration, therapeutic treatments, biological experiments etc.). “We’ve had an excellent partnership for 14 years now and we share a number of common interests. As a result of this trip we hope to extend the scope of our cooperation to other projects, including the creation of a CNRS International Associated Laboratory (LIA) at UCLA,” declares Timothy Deming. This is a real challenge and one which Sébastien Lecommandoux also welcomes. “We are both well aware of the immense potential of this situation,” adds the Californian researcher.

Accompanied by his wife, who is of Russian descent, and their young daughter, Timothy Deming was warmly welcomed in Bordeaux, by both the university and the city. He enjoyed the friendly atmosphere and people’s genuine interest in his presence here.

He has been back in Los Angeles since July and the adventure is continuing; interactions carry on, projects move forward, and the two researchers plan to see each other often. A win/win experience!
When it comes to wine, nearly all roads lead to Bordeaux. This is a well-known fact. It is therefore no coincidence that the Cité du Vin has chosen this city for its home. Defined as a “unique space with multiple experiences,” it is destined to become a national and cultural icon dedicated to wine as a living, universal heritage. Oenological sciences, on the other hand, are less widely-known among the general public and are the main focus at the Institute of Vine and Wine Sciences (ISVV), a multidisciplinary center for research, higher education, and development. This center, also one of a kind, is supported by the University of Bordeaux and welcomes scientists and students from around the world.

Establishing cross-disciplinary ties and de-compartmentalizing knowledge

So why not share this subject with everyone and make it more widely known? This is precisely the aim of Vendanges du Savoir, a cultural initiative launched by the University of Bordeaux, the University of Bordeaux Montaigne and the Cité du Vin. Adopt a multi-perspective approach to learning. Combine different genres, culture and science, art and knowledge. Provide keys for understanding the complexity and evolution of the vine and wine world. Highlight scientific research. Discover innovations. Understand phenomena... As Gilles de Revel, a Professor of Oenology at the University of Bordeaux, and member of the Vendanges du Savoir steering committee explains, “The ISVV has a genuine desire to inform the widest possible audience about the different aspects of Vine and Wine Science, ranging from Oenology to Literature, or Sensory Analysis, History, Geography, Social Sciences or Philosophy... We strive to share our discoveries and important insights with the general public and we have a team of professionals who are passionate about doing so,” he adds. A real opportunity for opening up this world to the public.

Starting this Fall, Vendanges du Savoir will take place on the first Tuesday of every month. Through conferences, debates, symposiums, interactive events, or “expert” tastings focusing on themes chosen by participants, each session will contribute to democratizing these fields, which appear so complicated from the outside.

The collaboration between the Cité du Vin and the ISVV is off to a successful start, where ideas are abundant and projects are flourishing. It is sure to be a promising harvest.
Can’t come to **Bordeaux**?

**Not a problem!**

Meet up with the **University of Bordeaux** throughout the world **in 2017**

Representatives of our International Office will be at these events and delighted to discuss our present and future collaboration with you. Send us a mail and let us know where to expect you!

*international-office@u-bordeaux.fr*

Looking forward to seeing you somewhere in the world next year!

---

**The annual APAIE conference**
- Takes place in Kaohsiung (Taiwan)
- **20>23.03.2017**

**The annual NAFSA conference**
- Takes place in Los Angeles, California (USA)
- **28.05>02.06.2017**

**The annual EAIE conference**
- Takes place in Seville (Spain)
- **12>15.09.2017**