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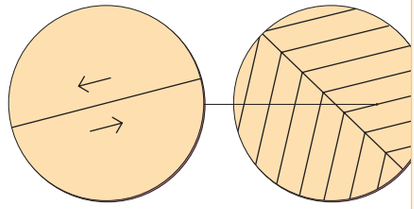

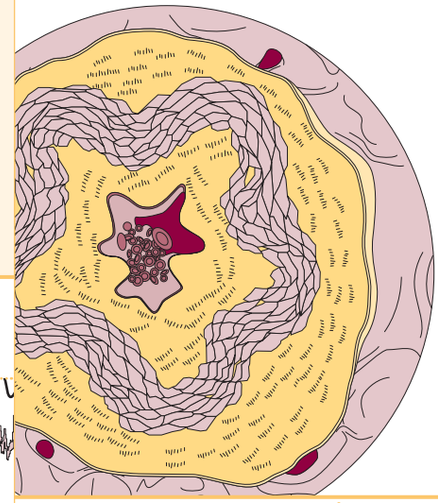

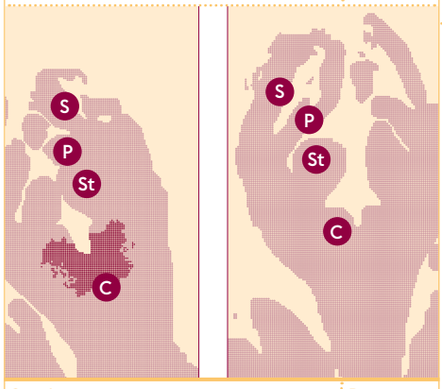

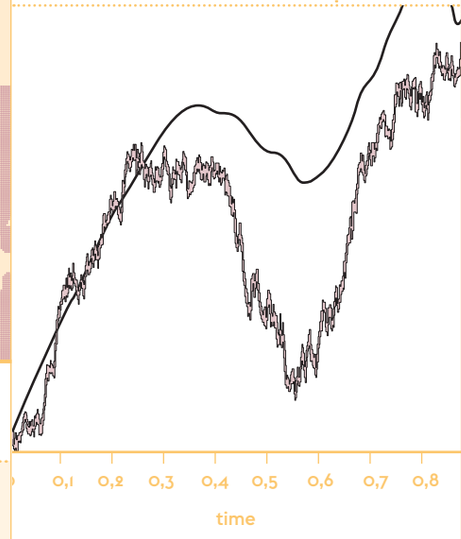

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Website: universite-paris-saclay.fr

A STUDENT'S VIEW

© Timothée Le Quesne

Timothée Le Quesne
Cocreator of EnergySquare
student at Télécom ParisTech

"Daniel Lollo and I were taking part in a student science project whilst studying at Télécom ParisTech, a Université Paris-Saclay member. We decided to create a product that could help everyone become less reliant on cables. This became a new electronic charging device, the contact-based recharging sheet EnergySquare for mobile phones and tablet computers. We then joined the ParisTech Entrepreneurs business incubator. The Energy-Square startup was laureate of the Paris-Saclay Startup Booster 2015. Thanks to Université Paris-Saclay, we spent one week in Silicon Valley meeting incubators, investors and local French entrepreneurs. Now our project is a real product and we have just finished our Kick-starter crowdfunding campaign, which was a huge success (we raised 315 % of our goal)."

A LECTURER'S VIEW

© M. Lecompt, Univ. Paris-Sud

Isabelle Demachy
Lecturer at Paris-Sud University

"Université Paris-Saclay is a melting pot in which the sharing of practices, the co-construction and the complementarity of cultures transform and enrich approaches and the profession of lecturers and researchers. Its trajectory towards a greater integration is the guarantee of a real transformation of the French higher education. Joint projects enhance synergies between French and foreign students from universities and Grandes Écoles. The UPSaclay brand will become visible and will come to stand for quality. It will support the students' education and occupational integration. In an open, hyperconnected world with countless challenges, the training of future leaders, researchers, engineers, technicians, managers must itself be open, plural and has to throw away the rule book to build a society where everyone can find their place."

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EDITOR'S LETTER

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On July 1st, I had the honor of presenting their doctoral degree to the first batch of Université Paris-Saclay doctors. This first class was clearly delighted to come together in the prestigious Palais des congrès de Versailles for the occasion. This "collector" class received the first 650 doctorates - the highest university degree - now common to all institutions clustered together within Université Paris-Saclay. The students entrusted us with the immense task of promoting their degree loudly and clearly worldwide. In a few weeks, 4,500 Master's students will be new Université Paris-Saclay graduates too. You will probably come across them on your campus, in your laboratory or in your company and we are very proud of this.

The path to shared graduation with all Université Paris-Saclay members is wide open and is gaining momentum with the definition of undergraduate higher education pilot programs. Our objective is twofold: providing challenging undergraduate education for students who are aspiring to apply to Université Paris-Saclay and scaling in terms of educational innovation. Université Paris-Saclay undergraduate education will allow innovative practices, successfully tested out in existing curricula, to be spread widely across the members of Université Paris-Saclay. Constant motivation, significant workload, strong involvement are already the rule in master's degrees and doctorates. These distinguishing features of a student coming from Université Paris-Saclay will also apply during undergraduate education.

"Innovative practices, successfully tested out in existing curricula, to be spread widely across the members of Université Paris-Saclay."

In this second issue of *L'Édition*, you will also find out about our research and education programs in mobility, transport, environment, economy, etc. backed by one of the major academic and industrial ecosystems in Europe. The territory of Université Paris-Saclay is supported by a 5-billion euro investment by the French state, spent on infrastructure and transport, on the creation of a campus that will be a real city at the cutting edge of French innovation in all areas

I hope that you will enjoy discovering new facets of this campus-city in this second *Édition*.

Gilles Bloch,
president of Université Paris-Saclay

Keywords
Accessibility, Atypical programme, Singapore


© Frédérique PLAS/CNRS Photothèque

· The 2016 CNRS Medal for innovation was awarded to **Thierry Heidmann** (CNRS/Paris-Sud University) for his work on new vaccine candidates.

· The DIAMONDS project received the 2016 EUREKA Award in the Innovation category. **Ana Cavalli** and **Stéphane Maag** (Télécom SudParis) are part of the team that assessed security testing methods at the industrial level.

· The ADAX project, on the detection of cyber attacks, won the ITEA Award of Excellence in the Business Impact category. It counts among its members **Hervé Debar** (Télécom SudParis).

· **Philippe Ciais**, a researcher from Laboratoire des Sciences du Climat et de l'Environnement (CEA/CNRS/UVSQ), received the 2016 Copernicus Medal from the Copernicus Society for the Promotion of International Collaboration in the Geo- and Space Sciences.

· **Sylvain Nicolle** from Centre d'histoire culturelle des sociétés contemporaines (UVSQ) was awarded the Assemblée nationale's thesis award for his PhD thesis about politics and drama.

· **Thibault Damour** (IHES) won the 2016 Lodewijk Woltjer Lecture from the European Astronomical Society for his work on general relativity, and was nominated a foreign honorary member of the American Academy of Arts and Sciences.

· The **Master's degree in Competition and Contract Law**, directed by Muriel Chagny, was elected first of the 2016 Eduniversal ranking, in the "Economic law – Competition law" category. The master's degree also won the 2016 Eduniversal pedagogy trophy.


© Télécom SudParis

· The IPNQSIS project, of which **Ana Cavalli** (Télécom SudParis) is a member, received the Celtic-Plus Award in the Innovation category for its mechanisms monitoring and managing the quality of IPTV, mobile TV, voice over IP and video-conferencing services.

· **François Gelis** (CEA) and **Ubirajara van Kolck** (CNRS/Paris-Sud University) won the 2015 Langevin prize, attributed last June, for their work on quantum chromodynamics and nuclear physics' effective field theories, respectively.

© Université Paris-Saclay

An agreement with Singapore

A commercial and financial hub, Singapore became one of the first partners of France in Asia. A joint PhD agreement was signed between the Nanyang Technological University of Singapore and Université Paris-Saclay, on June 13th in Singapore during a visit of UPSaclay President, Gilles Bloch, and general director, Claude Chappert. Following the MoU signed on May 18th, the agreement confirms the commitment of both universities to develop their common interests, from environmental and social sciences to materials, energy, healthcare and biology to communication and numerical simulations.


© Villebon - Georges Charpak

An unusual institute

The *Institut Villebon – Georges Charpak* is designed to give a new chance to students who did not perform very well in high-school but show a real potential. 70% of them are scholarship students. The three-year scientific education program involves team work, project management and developing creativity as well as curiosity. This atypical profile is highly popular in interdisciplinary or generalist Grandes Écoles or universities. At the same time, the institute is a place for teachers from all disciplines to try new teaching ideas out and share best practices. The *Institut Villebon – Georges Charpak* is supported by Grandes Écoles, universities and companies from Université Paris-Saclay and is the perfect example of the joint efforts UPSaclay stands for.

<villebon-charpak.fr>

How to master digital accessibility

© Alban Barthélemy

Université Paris-Saclay teamed up with a dedicated association and corporate volunteers to develop digital accessibility in its curricula.

Have you ever wondered how a visually impaired person can make an oral presentation with slides? They can use a device called a refreshable braille display or braille terminal that describes to them what is on the screen in braille characters. Alex Bernier, CTO of Braillenet, used such a tool during the Tour de France of digital accessibility, the association organized with Nokia, under the patronage of Madame Lemaire, French Minister of State for the digital sector. Added to this were screens that repeat the slides all over the room, a transcript in real time of what is said projected on another screen and a systematic use of microphones.

This is what digital accessibility looks like: firstly, improving disabled people's social inclusion in different areas such as culture, higher education, business, etc. using new technologies and, secondly, making new technologies available to disabled people. And it all starts with the internet. A number of good practices have been suggested to take into account people who are visually impaired, hard of hearing or who have motor difficulties, when designing a web page. For example, making your website perceptible with not only vision but also hearing is a good idea for everybody to be able to access it and for you to get your message across.

> **"This training is useful at all levels and for all areas, from R&D to communication to IT departments."**

Université Paris-Saclay and its members are involved in the development of digital accessibility. To go further than the redesign of Université Paris-Saclay's website, they put in place a partnership with Braillenet and Nokia. Both partners are developing e-learning tools together, in order to educate the company's employees in e-accessibility: how to write web pages, Office and LaTeX documents, or make their slides accessible, etc. This training is useful at all levels and for all areas, from R&D to communication to IT departments.

And with these e-learning tools, Braillenet and Université Paris-Saclay have implemented a training program for computer course teachers. These teachers can then train their students, for example in suitable website or apps design, whether concerning the code's or the pages' appearance. That way, Nokia can hire young computer specialists who already are aware of and, above all, trained in accessibility issues.

Université Paris-Saclay's students and teachers would like digital accessibility to be a standard specification. More courses will thus be developed to cope with the high demand.

<universite-paris-saclay.fr/en/news/digital-accessibility-from-university-to-companies>

Section

DON'T MISS OUT ON...

SEPTEMBER

Description
An *Académie des Sciences* symposium to anticipate the future trajectories of genetics, 150 years after Mendel.

Date
11 to 13

Place
Paris, France

Host
Inra, Paris-Sud University, CNRS, AgroParisTech

Link
<versailles-grignon.inra.fr/Evenements/201609-Trajectoire-de-la-genetique>

Description
The 19th international symposium on Research in Attacks, Intrusions and Defenses (RAID 2016)

Date
19 to 21

Place
Evry, France

Host
Télécom SudParis

Link
<raid2016.org>

Description
The HEC Paris Finance 4 Good conference.

Date
29

Place
Jouy en Josas, France

Host
HEC

Link
<hec.fr/News-Room/Evenements/(id)/51972>

OCTOBER

Description
A workshop and a forum to boost the energy transition

Date
04 to 05

Place
Palaiseau, France

Host
Université Paris-Saclay members

Link
<universite-paris-saclay.fr/en/transition-energetique>

Description
The 25th *Fête de la Science* to discuss with and discover the work of scientists.

Date
08 to 16

Place
France

Host
Université Paris-Saclay members

Link
<enseignementsup-recherche.gouv.fr/cid97884/25eme-edition-de-la-fete-de-la-science-en-2016.html>

Description
The 9th international conference on Informatics in Schools: Situation, Evolution and Perspectives (ISSEP), in both primary and secondary schools.

Date
13 to 15

Place
Münster, Germany

Host
ENS Paris-Saclay

Link
<issep2016.ens-cachan.fr>

Description
The TEDxHEC Paris: Truth or Dare? That is the question.

Date
14

Place
Jouy en Josas, France

Host
HEC

Link
<hec.edu/News-Room/Events#>

Description
The Forum of the Institutes for Technological Research.

Date
18

Place
Palaiseau, France

Host
IRT SystemX

Link
<irt-systemx.fr/en/forum-des-irt-2016>

Description
A week to put the spotlight on open access with some training courses, conferences and events.

Date
24 to 28

Place
France

Host
CentraleSupélec, UVSQ, UPSud, UEVE

Link
<openaccessweek.org>

NOVEMBER

Description
The 2016 Social Business Academia Conference with Nobel Peace laureate Professor Muhammad Yunus.

Date
09 to 10

Place
Jouy en Josas, France

Host
HEC

Link
<socialbusinesspedia.com/sbac/2016>

Description
The Uranium Day to discover the different research areas of the uranium cycle, through academic as well as industrial approaches.

Date
28 to 29

Place
Orsay, France

Host
Paris-Sud University, CEA

Link
<geosoc.fr/manifestation/agenda-des-reunions-colloques-sgf/event/268-journee-de-luranium.html>

JANUARY

Description
The 44th ACM (Association for Computing Machinery) annual symposium on Principles of Programming Languages, that is one of the most prestigious and oldest computer science conventions.

Date
18 to 20

Place
Paris, France

Host
ENS Paris-Saclay, CentraleSupélec, Paris-Sud University

Link
<conf.researchr.org/home/POPL-2017>

Illustrations on the right page and page 16: **Clément Vuillier**

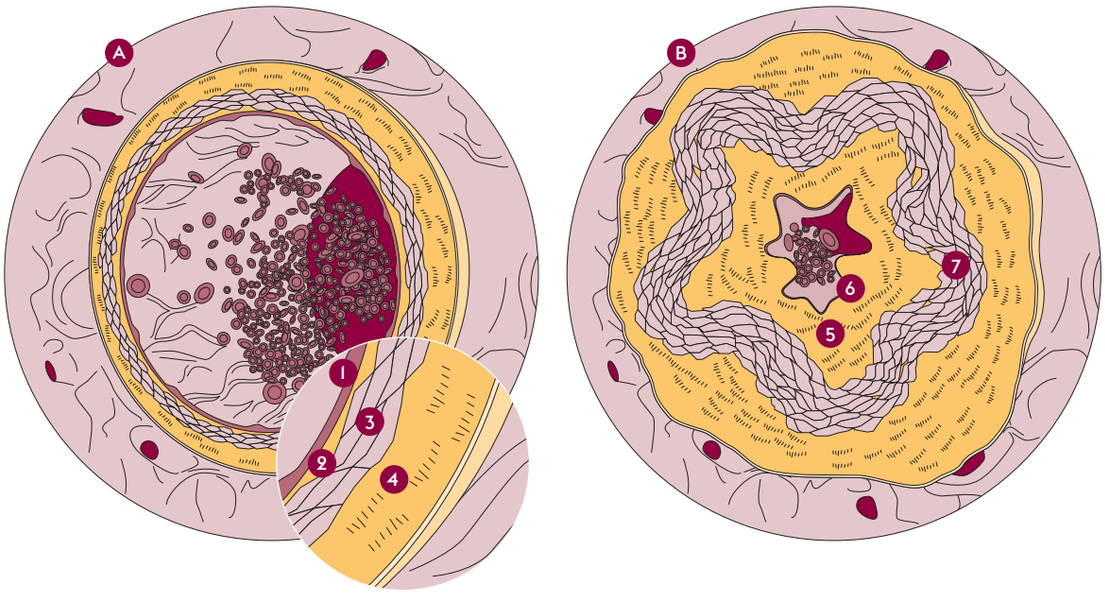
Keywords
Interfaces, Biology, Disease, Algae, Lineage

Institute
Inserm - Paris-Sud University

Expert
Sylvia Cohen-Kaminsky

Title

PAH: a new biological target identified



COMPARISON OF HEALTHY (A) AND PAH PULMONARY (B) ARTERIES.

1– Endothelium
2– Intima
3– Media & SMC
4– Adventitia
5– Intimal fibrosis
6– Endothelial proliferation
7– Medial thickening: SMC hypertrophy & hyperplasia

Name

Sylvia Cohen-Kaminsky


© Sylvia Cohen-Kaminsky

Inserm UMR_S 999

Research director at CNRS, Sylvia Cohen-Kaminsky worked on the autoimmunity, hematology, neuroimmunology domains, and cognitive aspects such as the immunological synapse. She is head of a team from Inserm unit UMR_S 999, dedicated to the Pathophysiology and Therapeutic Innovation in PAH. Member of the LERMIT laboratory of excellence and the TORINO hospital-university department, she coordinates innovative and multidisciplinary projects at the intersection of biology, chemistry, nanotechnology and medicine.

Using biology and medical knowledge, a new drug target has been discovered to fight against a deadly disease that affects the lungs and the heart. Based on this and thanks to medicinal chemistry, an efficient treatment may soon become available.

Sometimes you just have to change your tactics. When a disease is stronger than most available treatments, it is time to take another road to overcome it. This is the case with PAH.

Pulmonary arterial hypertension, or PAH, is a serious disease with a 5 year life expectancy after diagnosis. It corresponds to the progressive narrowing of small blood vessels inside the lungs near the lung-blood exchanges area, associated with cell dysfunction and inflammation. The lung's smallest capillaries are composed of endothelial cells (ECs) that are also found in small arteries along with vascular smooth muscle cells (SMCs). In case of PAH, ECs and SMCs proliferation progressively obstructs the small pulmonary arteries. SMCs also proliferate in capillaries where they should not be.

This overproliferation is called "remodeling". It impairs the blood flow and increases the blood pressure within the lungs. Symptoms include shortness of breath, chest pain, dizziness and eventually right-sided heart failure. This disease is manageable, thanks to vasoactive agents which increase pulmonary arteries vasodilation and inhibit to some extend the vascular remodeling, thus lowering pulmonary arterial pressure.

But these treatments do not tackle the reason for the so-called cancer-like overproliferation of the pulmonary vascular cells and thus cannot cure the disease. This is why a team led by Sylvia Cohen-Kaminsky from Inserm and Paris-Sud University, both members of Université Paris-Saclay, tried to think outside the box. Supported by the laboratory of excellence LERMIT, they came up with an entirely new biological target.

The NMDA receptor (NMDAR) is a glutamate receptor used in neuronal synaptic communication. It is known to promote the proliferation of cancer cells and is present in cerebral vascular endothelial cells. Yet, some neural receptors are also found at the periphery, i.e. outside of the central nervous system. The team from Inserm hypothesized that the NMDAR could also be responsible for the cancer-like proliferation of pulmonary vascular cells. Like neurons, these cells are in fact equipped for functional

synaptic-like glutamatergic communication through NMDARs. The glutamate/NMDAR pathway is also dysregulated in PAH and glutamate accumulates in pulmonary arteries of PAH lungs. The PhD candidate Sébastien Dumas demonstrated *in vitro* that the NMDA receptor is indeed involved in the uncontrolled lung microvascular cells proliferation. Dealing with this unexpected and hitherto unseen target would provide a welcome support to established treatments.

Biologist Dr Cohen-Kaminsky then turned to a Paris-Sud University team of chemists from CNRS-Biocis, led by Mouad Alami, to find a therapeutic molecule able to go after this new target. They discovered that some already known molecules aimed at the neuronal NMDAR work well in pre-clinical animal models of PAH: they inhibit the perivascular inflammation, stop the remodeling and save the heart in less than 7 days! More than 12 parameters relevant to PAH are normalized thanks to this treatment. But that molecule can affect the central nervous system with serious side effects on memory and the learning process.

Clear and innovative specifications were thus given to the team of chemists: they had to find an "intelligent" molecule that would not go through the blood-brain barrier and would not reach the central nervous system, but would have the same effect as the known molecules. That was a real challenge. Chemists created series of molecules that were tested by biologists. Having an idea of what they were looking for, thanks to the already available - if not safe - treatment, the scientists only had to test about 200 candidates, compared to the usual high throughput screening of a large bank of 20,000 molecules.

Two chemical series have been patented (as well as a novel mechanism of action of the molecules). *In vivo* proof of concept using the novel molecules should begin in September, with the ambitious goal to get a drug candidate as early as 2018. UPSaclay's office of technology transfer (SATT Paris-Saclay) will also accelerate the technological maturation process. The future clinical trials will be led by the National Referral Center on Severe PAH and the "Thorax Innovation" (TORINO) hospital-university department led by Prof. Marc Humbert at the Hospital Bicêtre (a AP-HP university hospital). This groundbreaking treatment is a real chance for PAH patients.

Moreover, in the frame of the ANR NUTS project coordinated by Sylvia Cohen-Kaminsky, researchers (in particular Luba Tchertanov from ENS Paris-Saclay, another UPSaclay member) are currently building a dynamic molecular model of the NMDAR. The idea is to add mathematics and bioinformatics to medicine, biology and chemistry, to tackle this multidisciplinary task. Each atom of the target receptor (the NMDAR) is very precisely modeled in order to provide a tool for *in silico* (that is with numerical simulations and 3D visualisations) screening of next generation NMDAR antagonists.

But Dr Cohen-Kaminsky's team, together with the chemistry team led by Dr Mouad Alami, intends to go even further, developing a more intelligent second generation molecule, able to specifically target only the inflammation sites and not the whole body. This more targeted treatment should ne more effective in challenging PAH.

Publications

· Le récepteur **NMDA**, un nouvel acteur du remodelage vasculaire dans l'hypertension artérielle pulmonaire, par Sébastien Dumas sous la direction de Sylvia Cohen-Kaminsky - UPSaclay

· S.J. Dumas et al. **NMDA**-type glutamate receptor activation promotes vascular remodeling and pulmonary arterial hypertension. In revision Science Translational Medicine

· S.J. Dumas et al. Glutamatergic signaling through pulmonary vascular **NMDA** receptors in pulmonary hypertension. Eur Resp J46 (suppl 59):PA4898. September 2015

· S. Cohen-Kaminsky et al. Inflammation in pulmonary hypertension: what we know and what we could logically and safely target first. Drug Discov Today. 2014 Aug;19(8):1251-6 Review

» focus

A unique toolbox to reconstruct cell lineages

To produce accurate cell lineage trees, researchers have to analyse embryonic cell dynamics from huge in vivo 4D data sets. To do so, the Paris-Saclay BioEmergences CNRS Unit for Service and Research (USR3695) developed a cutting-edge workflow platform, from image acquisition and fast automated processing to the interactive visualization of reconstructed data with the custom-made interface Mov-IT. This platform is delivered in standalone or web service mode.

Publication · E. Faure et al. A workflow to process 3D+time microscopy images of developing organisms and reconstruct their cell lineage. Nature Communications 7

» focus

How to sniff out diseases

Diseases change our blood composition, thus altering our breathprint. With the Technion (Israel), an Inserm/Paris-Sud University team is building an artificial nose dedicated to early PAH detection. Made of gold nanoparticles coupled with chemical molecules, it detects the volatile compound signature of our breath, thus specifically identifying PAH, in a non-invasive and safe way. After the proof of concept in the Snoopy1 trial, Snoopy2 is a large scale validation that could eventually make general screening of PAH available.

Publication · S. Cohen-Kaminsky et al. A proof of concept for the detection and classification of pulmonary arterial hypertension through breath analysis with a sensor-array. Am J Respir Crit Care Med. 2013, 188:756-9

» focus

A microdevice to study algae's permeabilization

A CentraleSupélec/ENS Paris-Saclay team developed a microdevice for real-time visualization during Pulsed Electric Field solicitations on microalgae. This process could limit the use of eco-destructive solvents to extract the algae's lipids, a renewable source for biofuels. A good cell membrane permeabilization is achieved, with reduced energy consumption and heat effects, when applying short pulses of high electric field. This study is also the first demonstration of lipid droplets behavior under an electrical field.

Publication · P. Bodénès et al. Microdevice for studying the in situ permeabilization and characterization of Chlamydomonas reinhardtii in lipid accumulation phase. Algal Research, 2016, 16

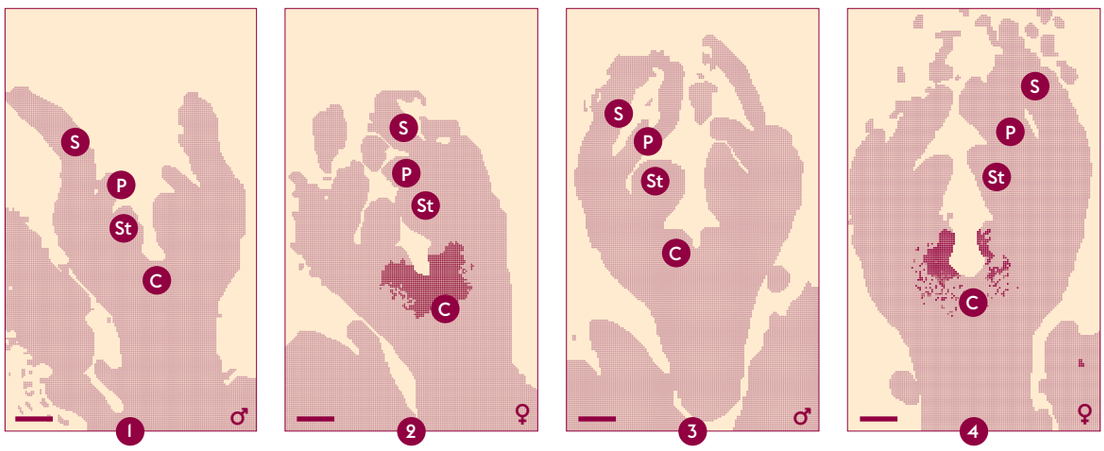
Keywords
Agronomy, Prototype, Meiosis, Platform

Institute
Institute of Plant Sciences Paris-Saclay

Expert
Abdelhafid Bendahmane

Title

A platform to engineer new plants



GENE CLACS7 IN SITU EXPRESSION IN FLOWER BUDS AT STAGES 4 IN MALE (1) AND FEMALE (2) FLOWERS OF MONOECIOUS WATERMELON AND MALE (3) AND HERMAPHRODITE (4) FLOWERS OF ANDROMONOECIOUS WATERMELON.

C– Carpel;
St– Stamen;
P– Petal;
S– Sepal.
Bars: 100 µm

Name

Abdelhafid Bendahmane


© Abdelhafid Bendahmane

Inra/CNRS

Vice-director of URGV, the plant genomics research unit, Abdelhafid Bendahmane works mainly on crops, which he deems more useful than studying model plants. He uses the TILLING approach to identify virus resistance genes, sex determination genes, etc. To do this, he and his team build a dedicated platform. He is also a professor at Paris-Sud University.

Abdelhafid Bendahmane's team built a platform dedicated to improving plants' farming and commercialization.

Today's farming is a real challenge. Plants need to survive diseases and pests, to bloom not to soon but not too late in the season and to adapt to a changing climate. And, in order to get commercialized, we mustn't forget the importance of shape, color and juiciness.

Usually, selectors use a trial and error strategy to search for varieties that are adjusted to new conditions, such as the vagaries of climate (warming, drought) and diseases that affect the plant growth. They identify the few plants that survived and select their seeds. They cross the selected plants to combine the favorable genetic traits. To do this, seed or genetic resources banks are required. To make this selection process easier, researchers wanted to implement a more efficient system. So they decided to create a dedicated platform with advanced tools.

Université Paris-Saclay proved to be a driving force to gather the scientists together in an institute able to create such a platform. The Institute of Plant Sciences Paris-Saclay - IPS2 (CNRS/Inra/UPSud/UEVE) rose to the challenge of enhancing the improved genetic materials created by teams in its laboratories. In particular, Abdelhafid Bendahmane and his team deal with translational research: they make actual products out of cutting-edge research ideas or results on crop improvement.

> **"The new platform enables scientists to go further and create new alleles, but without GMO."**

The main idea behind the platform is to design new plant prototypes, using a gene bank and allele engineering. For example, a tomato represents 40 000 genes and, to get the tomato you want, you have to find the correct version of each gene, i.e. the proper allele. But finding it is the old way of doing it. The new platform enables scientists to go further and create new alleles, but without using genetic transformation technologies.

To do so, Dr. Bendahmane's team uses advanced reverse genetic tools to isolate genes of agronomic importance, using the TILLING and

ECOTILLING approaches. TILLING is a reverse genetic non-transgenic approach and its variant ECOTILLING examines natural genetic variation in populations.

Scientists have developed ingenious tools to extract DNA, screen and identify alleles. They no longer need to farm more than 5,000 plants (and deal with the huge seed bank associated with them) to identify just one mutation. The tools developed and patented by the team, like ENDOI and the new SENTINEL, helped to optimize the accuracy and efficiency of the detection of a mutation in a gene.

In normal DNA, nucleobases (the famous A, T, G and C) form pairs: A goes with T, and C with G. If a mutation occurs (like an A becoming a G), there is no more pairing and the two DNA strands separate at that point. The ENDOI enzyme, normally used to recycle DNA, can detect such mismatches. The SENTINEL software was developed to speed up the identification of alleles of agronomic value. With these new tools, a scientist can screen up to 30 genes a month, instead of just one with traditional methods. To organize and store the data generated, researchers have also developed the UTILLdb database.

Using this platform, Dr. Bendahmane and his team have created several alleles with a clear agronomic value. For example, they have identified a variety of peas with a better digestibility for the animal feed industry and a virus-resistant tomato. They have also generated several lines of melon with better post-harvest conservation.

More recently, the scientists focused on sex determination in flowering plants. Since the fruit is almost always the female part of a flower, productivity can be enhanced if all the flowers in a field are female. The transition from monoecy (having both male and female flowers) to gynoecy (only female flowers) results from an epigenetic mutation in a transcription factor, a protein that controls the initiation and speed of the mechanism producing DNA copies within cells. Once they identified the gene that causes gynoecy, the team was able to create new more efficient alleles for melon production. These studies on the melon plant may also be transposed to other species of agronomic interest, to help meet the vital challenge that farming is.

Publications

· S. Minoia et al. Induced mutations in tomato SlExp1 alter cell wall metabolism and delay fruit softening, Plant Science, Volume 242, January 2016, Pages 195-202, **ISSN** 0168-9452

· Bendahmane, A., Marcel F., Dalmais M., Beaumont G., Mania B. Logiciel **SENTINEL** dédié à l'analyse **TILLING** par **NGS**. Certifier par l'Agence pour la Protection des programmes. Inter Deposit Digital Number. FR001.240004.000.R.P.2016.000.10000 (Activité développement d'outils dédiés à la recherche translationnelle).

· Bendahmane A, Triques K., Sturbois B., Aubourg S., Caboche M., (2004) Method for producing highly sensitive endonucleases, novel preparations of endonucleases and uses thereof. PCT/EP2005/009220

· Minoia S., Boualem A., Marcel F., Troadec C., Quemener B., Cellini F., Petrozza A., Vigouroux J., Lahaye M., Carriero F., Bendahmane A. (2016) Induced mutations in tomato SlExp1 alter cell wall metabolism and delay fruit softening. Plant Science 242:195-202

» focus

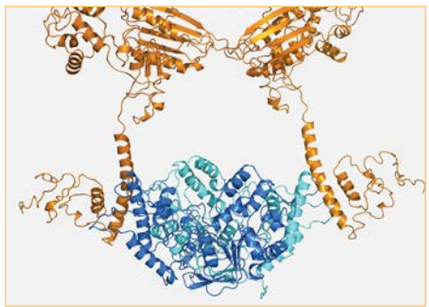
The Plant Observatory

Within the SPS Labex, the Institut Jean-Pierre Bourgin (Inra/AgroParisTech) and IPS2 (Inra/CNRS/UPSud/UEVE/UP7) provide a set of resources to all researchers and private companies for plant analysis. This Plant Observatory provides genetic resources, controlled and reproducible culture equipment, multi-level phenotyping (transcriptome, biochemical and metabolite analysis) and imaging tools, etc. All platforms have the IBiSA label, delivered by a consortium in which Inserm, CNRS, Inra, CEA and Inria are represented.

<observatoire-vegetal.inra.fr>

» focus

A breakthrough in meiosis



© Claudine Mayer

Meiotic recombination, necessary to sexual reproduction, combines genetic traits to produce offspring that differs from parents. It is initiated by DNA double strand breaks that are catalyzed by two non redundant proteins (in blue). A team from INRA and Institut Pasteur showed that meiosis also requires another protein (in gold) that may combine in a pair to bond with the catalytic dimer, creating an enzymatic complex. The genetic mixing that happens during meiosis can be used to create new plant varieties with chosen features.

Publication · N. Vrielynck et al. A DNA topoisomerase VI–like complex initiates meiotic recombination. Science 26 Feb 2016 Vol. 351, Issue 6276, pp. 939-943

» focus

Deciphering plant maturation

The control of seed maturation involves 3 main regulators. A team from Institut Jean-Pierre Bourgin (Inra, AgroParisTech, CNRS) uncovered the long-sought underlying molecular mechanism linking these proteins. They form a regulatory complex, binding DNA elements with different specificities for flanking nucleotides, to create a synergistic effect that leads to initiation of seed maturation in plants like the Arabidopsis model.

Publication · S. Baud et al. Deciphering the molecular mechanisms underpinning the transcriptional control of gene expression by master transcriptional regulators in Arabidopsis seed. Plant Physiology, June 2016, Vol. 171, pp. 1099-1112

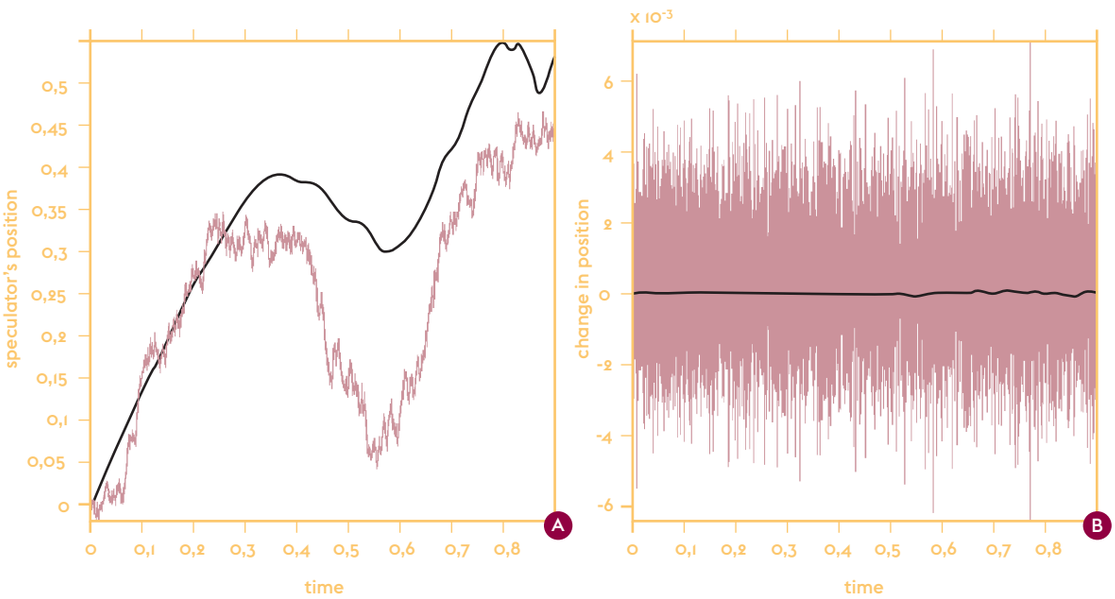
Keywords
Economy, Trading, Models
Welfare, Gender gap

Institute
HEC

Expert
Johan Hombert

Title

Why trading speed matters



FAST AND SLOW SPECULATION

A– Evolution of the speculator's position over time
B– Speculator's trade (change in position) over time. The liquidation time t=1 corresponds to one trading day

fast
slow

Name

Johan Hombert

HEC

An associate professor of finance with tenure at HEC, Johan Hombert is a part of the GREGHEC research laboratory (CNRS/HEC) and of the Centre for Economic Policy Research (CPER). He studied at ENSAE and École Polytechnique. He won a number of awards, including the 2016 "best young researcher in finance" prize awarded by Institut Europlace de Finance. His research focuses on the frictions in the financial markets, corporate finance and industrial organisation.

In speculation, speed is as important as insight and market knowledge. A research team from HEC, a Université Paris-Saclay member, explains how and why. Their innovative model agrees well with what is seen in Wall Street or other financial market places.

Traders handle millions of dollars each day, selling and buying assets, shaping markets in a matter of seconds. Obviously, they need a strategy to make their decisions. Everything is based on what information they can get their hands on.

Today's financial markets are characterized by an almost continuous flow of "news". Everything can be a source of information: in particular, machine-readable text such as tweets, Facebook pages, blogs, newswires, company websites, etc. have a very high renewal rate. Some high-frequency traders can use these data to set the price of their assets and optimize their profit.

Thierry Foucault, Johan Hombert and Ioanid Roşu from HEC, a Université Paris-Saclay member, proposed the first dynamic model of trading on news. They distinguished two cases. On the one hand, a "slow" speculator who only trades when the news is known to everyone. He gets his strategy from public information. On the other hand, the "fast" trader decides to buy or sell from his forecast of the news, that is to say ahead of incoming news. He plans on private signals and his own analysis of how the market will behave. He can anticipate short-term price movements, thanks to soon-to-be-released information.

But a fast speculator's actual trade is a combination of his estimate of the long-run price change (over a period of hours or days) that depends on the history of signals he had about this asset, and his short-run forecast of impending next-second news. The trader might deviate from his long-run desired position to aggressively exploit short-term optimizations. Aggressive operations are thus correlated with news.

Let's take an example. To make matters simpler, we will use amounts of money everyone can understand. Suppose a fast speculator receives a positive signal on an asset he currently estimates at $1,000. He then expects the asset's price to increase in the short-run, so he will buy some (say 5). But he also forecasts, based on the asset's history of signals, that the asset's payoff is about $800 in the long-run.

> **“The fast speculator anticipate short-term price movements, thanks to soon-to-be-released information.”**

This calls for a sell in anticipation of the price decline. Our trader will have spent 5 times $1,000, that is $5,000, to purchase assets before the price reached say $1200. He can then sell 5 times $1,200-worth assets before the price decreases to $800. In the end, he will not only have avoided losing money (since he sold before the price drop) but he will also have earned $1,000.

All this happened in seconds. And only our fast speculator saw this opportunity: the slow one, only aware of the dropping price in the long run, did not buy any of this asset. He did not lose money but he did not earn any either. To do so, he would have had to act on news that contradicts his desired long-run position, meaning he would have to buy when everything tells him he will have to sell in the long term. Compared to previous models, taking into account this volatility is an entirely novel features that makes HEC’s model more complete.

With this model, predictions are possible. Surprisingly, news informativeness has a double contradictory impact on high-frequency trading. The more informative the news is, the more prices react to it. Thus, the fast speculator trades more aggressively and he is more at risk on short-term price changes. But, at the same time, because he has more information, he is less at risk of losing money on the long-run. So, all things considered, trading impacts prices less (the market is said to be more liquid).

Informative news also mean a larger profit from short-run price movements since prices are more sensitive to news and high-frequency becomes an advantage. In our example, the fast speculator managed to earn $1,000, the slow one missing the beneficial movements. From another perspective, the more informative the news, the more the speculator’s long-run informational advantage is reduced. So profit from speculating smoothly on the long-run value of the asset (the “value trading”) declines. Nevertheless, total profit decreases when news are informative, regardless of whether the speculator is fast or slow, but at a lower rate for fast traders. So, on the whole, being fast increases net gain. Those predictions are well established among traders, which rules in favor of this new dynamic model. The next step should be to consider a case with multiple speculators. As challenging as it may be, HEC’s researchers plan on extending their model in future work.

Publications

· T. Foucault et al. News Trading and Speed. Journal of Finance, 2016

» focus

A way to compare models

Moment condition models are used to estimate parameters in statistics. A difficulty of these models arises when they are misspecified, ie when no value of parameters allows the data distribution to satisfy the moment conditions. Anna Simoni (CNRS/CREST - ENSAE) and her american collaborators built a framework able to compare such models.
It selects the correctly specified model that contains the maximum number of valid moment restrictions or the model that is the least misspecified.

Publication · S. Chib et al. Bayesian Empirical Likelihood Estimation and Comparison of Moment Condition Models

» focus

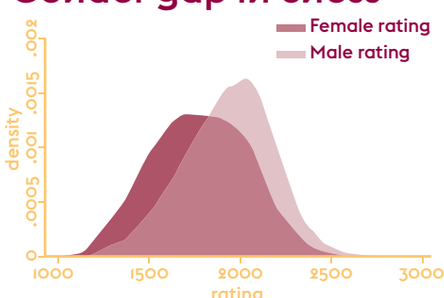
Untrustworthiness leads to large ineffective welfare

Trustworthy “civic” people consent to pay high rates of tax as long as they are convinced that their compatriots pay their taxes too and do not misuse social benefits. “Uncivic” individuals want to profit from the system, so they support large welfare states. In a model, Pierre Cahuc from École Polytechnique and his team showed that these two opposing forces can lead to a twin peaks relation between trust and the size of the welfare state, and that the creation of large, transparent and effective welfare states needs a large majority of trustworthy citizens.

Publication · Y. Algan et al. Trust and the Welfare State: the Twin Peaks Curve. The Economic Journal, 126: 861–883.

» focus

Gender gap in chess



Chess competitions are a good way to test new explanations of gender gap. Chess offers an experimenting field that goes beyond the traditional explanations (discrimination, career-family trade-off, productivity differences). A team from Paris-Sud University, École Polytechnique and CNRS analyzed all the official competitions in the world from 2008 to 2013. Women may suffer from a small-scale, yet systematic, psychological effect when competing against men. Its cumulative effect could explain the so-called glass ceiling.

Publication · J. de Sousa and G. Hollard. Gender Differences: Evidence from Field Tournaments. March 27, 2016. To be published.

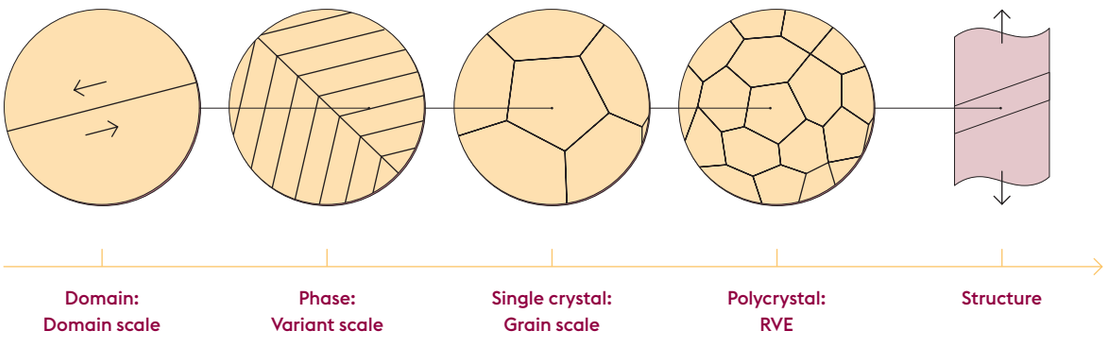
Keywords
Multi-scale, Alloys, Plasticity, Spray, Crowd

Institute
École Normale Supérieure Paris-Saclay

Expert
Olivier Hubert

Title

Memoirs of a key multiscale modeling



THE MAGNETIC SHAPE MEMORY ALLOYS: A MULTISCALE CHALLENGE

Name

Olivier Hubert


© Olivier Hubert

École normale supérieure Paris-Saclay

A professor at ENS Paris-Saclay, Olivier Hubert is in charge of the "Multiphysics Coupling" research unit. He develops behavior models for materials that can change their phases, including shape memory alloys. He is also responsible for the microscopy resources of LMT-Cachan test centre and president of MECAMAT, the French association of materials mechanics.

For the first time, researchers from ENS Paris-Saclay gave the principles of a unified multiscale modeling of magnetic shape memory alloys. These materials exhibit a complex multiphysic coupling with thermal, mechanical and electromagnetic behaviors.

Shape memory alloys (SMA) are metallic materials that "remember" their original shape. They are usually used as miniature sensors, actuators or holders, for robotics, aerospace or medical applications. These materials can then change shape or stiffness (generating a displacement), their resonant frequency or other mechanical characteristics in response to a temperature change. But they return to their original state if necessary (usually at high temperature).

This surprising property is linked to structural changes at the atomic scale. The alloy exhibits at least two distinct structures or crystalline phases, depending on temperature or applied mechanical stress. Its shape is given at high temperature in the austenitic state. At room temperature, in the martensitic state, large magnitude irreversible deformation can be generated. Going back to the austenitic state at high temperature enables a return to the original shape.

The crystal structures are indeed different. For example, if the austenitic state has a cubic symmetry, three different tetragonal martensitic structures may be formed at constant volume, developed along the axis that shrinks. These possible structures are called "variants". The martensite phase can be described by the volume fraction of its variants.

A macroscopic deformation is associated with this transformation at the single crystal scale when an imbalance between variants occurs. A micro-macro approach is needed to model the influence of a thermal or mechanical loading on the polycrystalline alloy. Moreover, in the case of magnetic shape memory alloys (MSMA), applying a magnetic field can also create a macroscopic deformation.

Indeed, the magnetic field causes a variant reorientation, meaning that a variant transforms into one of the other two possible forms, creating an imbalance between variants. Reorientation will generally occur when one magnetic domain in the variant has clearly taken over the second one by magnetic wall displacement. The corresponding deformation can reach 12 % in single crystals and does not involve any heat exchange. This explains why MSMA can be used at much higher frequencies than conventional SMA.

Separation into four scales was required to model all of the mechanisms involved in the behavior of magnetic shape memory alloys. The first scale is the domain scale inside a variant: at this scale, the thermal, mechanical and magnetic properties can be considered homogeneous. The variant scale is the scale where only the mechanical and thermal quantities are assumed to be homogeneous. Each variant consisting of different magnetic domains, the magnetic quantities are no longer uniform. The third scale is the grain or crystal scale, considered as an assembly of variants. The polycrystalline scale is the fourth and final scale: this is the representative volume element (RVE) of the material. Most of the model parameters are physical parameters that can be found in the literature or identified with some simple experiments.

Macroscopic loadings are temperature, mechanical stress and magnetic field. The temperature is uniform over the four scales but each of the other loadings must be "localized"at the relevant scale, each local response influencing the loading at the upper scale. Stress at the single crystal scale is thus a function of macroscopic stress, macroscopic deformation and local deformation. Similarly, the magnetic field inside a crystal may be deduced from the macroscopic magnetic field and local and macroscopic magnetizations. A clear separation between the grain and RVE scales is required to implement such a homogenization process.

The algorithm is fast. Deformation and magnetization inside a crystal can be calculated over a loading cycle in less than one minute using a personal computer. To illustrate the principles of a unified multi-scale modeling of these materials, researchers from ENS Paris-Saclay worked on a Ni2MnGa alloy constituted of nickel, manganese and gallium. This material exhibits practical transition temperatures for experiment: the austenite / martensite transformation occurs at 45 °C, the inverse transformation at 54.9 °C.

The model is in good agreement with experimental results. Although the scientists have yet considered only a single crystal for experimental validation, this model is capable of representing the thermo-magneto-mechanical coupling of multicrystals, under stress, including multiaxial stress. To go even further, the researchers from ENS Paris-Saclay plan to extend their first model, developed in a reversible frame, to irreversible phenomena and propose quantitative validation experiments via deformation measurements under magnetic field or biaxial stress.

Publication

· M. Fall et al. A Multiscale Modeling of Magnetic Shape Memory Alloys: Application to NiMnGa Single Crystal. IEEE Transactions on Magnetics. Vol 52. Num 5. Pages 1-4. 2016

» focus

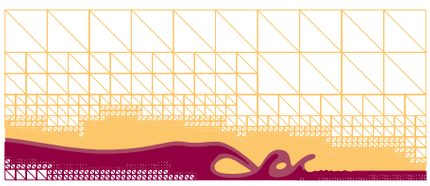
Simulation is not a straight path

The plastic behavior of metals is affected by their crystalline structure. A CEA team showed with their collaborators from Lyon and Nancy that the body-centred cubic metals' peculiar behavior is due to a deviation of the dislocation trajectory away from the straight line presumed in classical theories. The modified Schmid law inferred from the metal dependent trajectories obtained from electronic structure calculations compares well with macroscopic experimental data on the crystal orientation dependence of plastic flow.

Publication · L. Dezerald et al. Plastic anisotropy and dislocation trajectory in BCC metals. Nature Communications 7:11695.

» focus

From liquid to spray



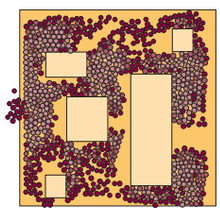
The quality of combustion and the formation of pollutants in combustion engines involve a number of physical phenomena at very different scales: centimetric instabilities when leaving the injector, millimetric drops that detach and then fragment into a mist of micrometric droplets. Florence Drui and her team from EM2C (CentraleSupélec) and MDLS (CEA/CNRS/Inria/UPSud/UVSQ) are working on a unified modeling, using reduced-order models and numerical strategies that are specific to high performance computing.

Publication · F. Drui et al. A hierarchy of compressible two-fluid models with identified physical relaxations and related numerical methods for the simulation of separated and dispersed phases. ICMF-2016 – 9th International Conference on Multiphase Flow.

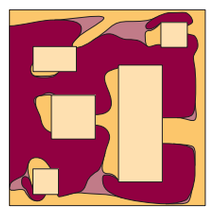
· F. Drui et al. Experimenting with the p4est library for AMR simulations of two-phase flows. ESAIM: PROCEEDINGS AND SURVEYS, March 2016, Vol. 53, p. 232-247

» focus

The crowd as a fluid



Microscopic scale

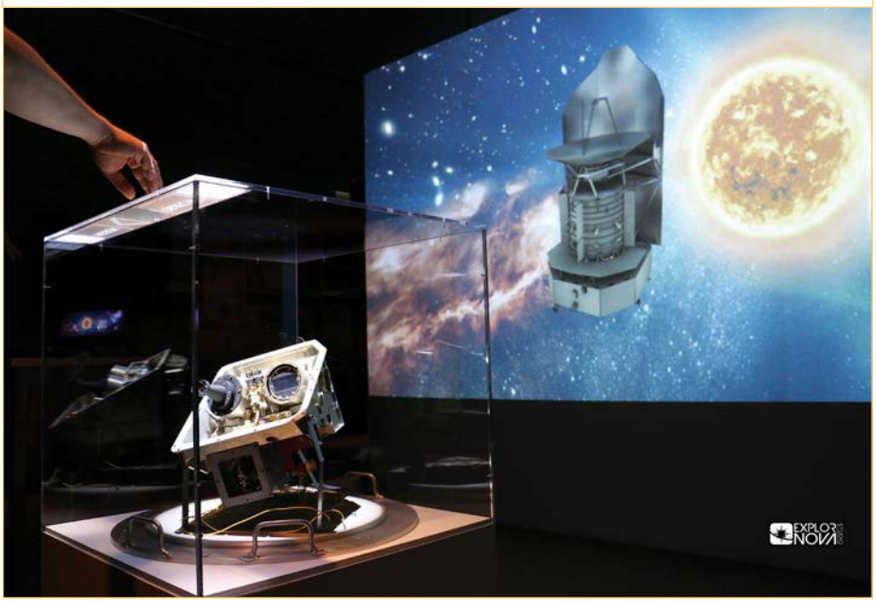


Macroscopic scale

Filippo Santambrogio and the team he belongs to at Paris-Sud University are developing mathematical models of crowds. They showed that microscopic models, where people are rigid disks that can't overlap, are well approximated by macroscopic models, where the crowd is a density much like a fluid, which is easier to compute. Modeling passive and active (intelligently adaptive to the presence of others) crowds trying to exit a room resulted in people finding an equilibrium but not the optimal one, unless there are constraints to influence their decision.

Publication · A. R. Mészáros, F. Santambrogio. Advection-diffusion equations with density constraints. Analysis and PDEs, 2016

A showroom for the universe



© Minier

Do you want to explore the entire Universe with a hand movement? It is now possible with the showroom installed at Orme des Merisiers (CEA, a UPSaclay member). CEA's guests discover a set of digital facilities and different objects at a single glance... or movement, with tactile interfaces and motion sensors everywhere.

The exhibition is organized around several activities. A central video mapping tool enhances some emblematic discoveries in astrophysics or nuclear physics. ExplorNova 360° offers an immersive interactive discovery of observations from ESA's space telescope Herschel and high definition panoramas from NASA's Curiosity rover. You can also observe exoplanets, Saturn, the LHC at Cern or Titan's dunes.

Comments, illustrations or animations come with these images. The digital tools are both fun and artistic, while disseminating astronomical and technical knowledge. For example, the "Mécanologie" installation explains the production process of scientific images, from raw data to aesthetic pictures.

The showroom also pays tribute to the human reality embodied by the instruments: an augmented cabinet of curiosities displays technical objects and prototypes. Some were manufactured on-site in the different departments of the Institute of Research into the Fundamental Laws of the Universe (IRFU, CEA). The interactive showroom is thus at the heart of research, on the Universe but also on science outreach.

This collaborative project, combining researchers and digital designers, is directed by Vincent Minier, coordinator of the ExplorNova project. Associated research focuses on digital technologies and their use to offer a sensitive experience of the Universe through images, sounds, movements, etc. In other words, to bring this amazing Cosmos ever closer to us.

<explornova.eu/wp/?p=514>

© La Physique Autrement 2016

Quantum made simple

How to explain the tunnel effect or Bose-Einstein condensate to a non-physicist or even a non-scientist? These are the questions Julien Bobroff and Frédéric Bouquet are trying to address in their group "Physics Reimagined" (Paris-Sud University/CNRS). For example, they have created a series of 3D animations, posters and pedagogical flyers about quantum physics with the help of colleagues from Paris-Sud University, CNRS, ENS Paris-Saclay, Institut d'Optique Graduate School and SOLEIL. The group develops similar collaborations between physicists, designers, artists or science outreach specialists to create various projects, such as the stop-motion movie "The researcher's article" about how scientists write and publish their scientific articles, for which they received the "Goût des Sciences" prize recently.

Publication
· J. Bobroff, F. Bouquet, C. Jutant. Le design et l'art pour vulgariser la physique. Proceedings Science & You, 9, 183 (2015)

<toutestquantique.fr>
<vulgarisation.fr>

The Diagonale Paris-Saclay

Science outreach is key to UPSaclay. A special "science & society" mission is dedicated to disseminating UPSaclay's scientific and technical discoveries: the Diagonale Paris-Saclay. It has supported 70 projects for the past 2 years, including workshops, open days, movies or a real laboratory for 8 to 15 year-old students called MISS. Science and art projects are a priority, since art seems a perfect way to talk about scientific achievements and, above all, journeys. This is why a dedicated festival, Curiositas, is organized: each year, a number of scientists, students and artists from the UPSaclay members gather together to produce an exhibition that provides both an aesthetic and a learning experience. The idea is to forge a close bond, diagonally between all the parties in society, from scientists to students to artists and the general public.

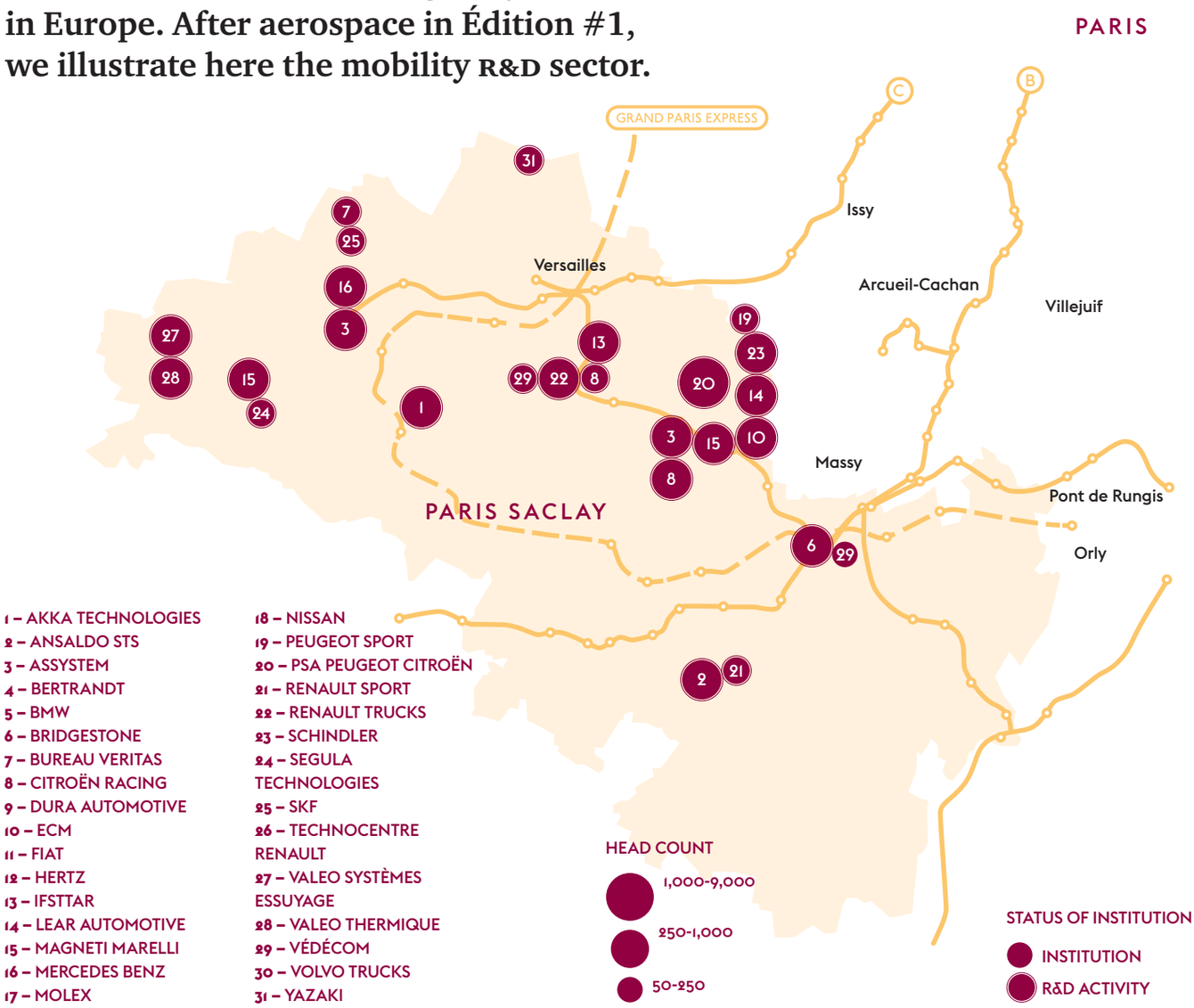
<ladiagonale-paris-saclay.fr>

"Art seems a perfect way to talk about scientific journeys."

Title

Mobility

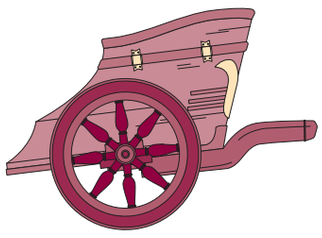
The Université Paris-Saclay ecosystem is one of the most technologically fertile in Europe. After aerospace in Édition #1, we illustrate here the mobility R&D sector.



1 – AKKA TECHNOLOGIES
2 – ANSALDO STS
3 – ASSYSTEM
4 – BERTRANDT
5 – BMW
6 – BRIDGESTONE
7 – BUREAU VERITAS
8 – CITROËN RACING
9 – DURA AUTOMOTIVE
10 – ECM
11 – FIAT
12 – HERTZ
13 – IFSTTAR
14 – LEAR AUTOMOTIVE
15 – MAGNETI MARELLI
16 – MERCEDES BENZ
17 – MOLEX
18 – NISSAN
19 – PEUGEOT SPORT
20 – PSA PEUGEOT CITROËN
21 – RENAULT SPORT
22 – RENAULT TRUCKS
23 – SCHINDLER
24 – SEGULA TECHNOLOGIES
25 – SKF
26 – TECHNOCENTRE RENAULT
27 – VALEO SYSTÈMES ESSUYAGE
28 – VALEO THERMIQUE
29 – VÉDÉCOM
30 – VOLVO TRUCKS
31 – YAZAKI

27,000
employees

130
institutions



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years
that the road N306 is used

23
Masters including 5 fully English-spoken Masters

· M2 Modélisation prospective: Economie, Energie, Environnement
· M2 Eco-innovation, Mobilité Durable et Société (EMDS)
· M2 Innovation Technologique - Ingénierie et entrepreneuriat (ITIE)
· M2 Conception des Systèmes Cyber-Physiques (CSCP)
· M2 Conception et Commande des Systèmes Critiques (CCSC)
· M2 Ingénierie de la Conception
· M2 Optimisation des Systèmes Industriels et Logistiques
· M2 Organisation et Pilotage des Systèmes Logistiques
· M2 Acoustical Engineering
· M2 Biomechanical Engineering
· M2 Dynamique des Fluides et Energétique
· M2 Fluids Mechanics
· M2 Formation à l'Enseignement Supérieur en Mécanique
· M2 Mécanique des matériaux pour l'ingénierie et l'Intégrité des Structures
· M2 Modélisation et Simulation en Mécanique des Structures et Systèmes Couplés
· M2 Modélisation

Multiphysique Multiéchelle des Matériaux et des Structures
· M2 Dynamique des Fluides et Energétique
· M2 Electrification & propulsion automobile
· M2 Maritime engineering : transport systems and offshore energies
· M2 Matériaux pour l'énergie et les transports
· M2 Matériaux, Technologies et Composants : Photovoltaïque-Véhicule Electrique
· M2 Renewable energy, science and technology
· M2 Sciences thermiques

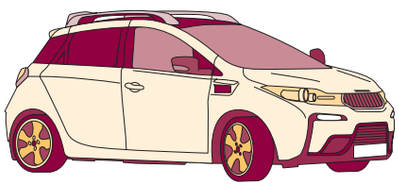
DESIGNING TOMORROW'S MOBILITY

SystemX and CentraleSupélec are launching the "Anthropolis" Chair, a 4-year research and teaching project. With the financial support of 5 industrial partners, the idea is to place people and their mobility at the center of the design of innovative and sustainable systems (commerce, energy, information, etc.) and services for urban and peri-urban planning.

VeDeCoM

an institute for energy transition

Supported by a number of UPSaclay members and partners, VeDeCoM builds a dual mode vehicle (manual control and self-driving) that is also carbon-free and connected. It is a part of the French national mobility and automotive R&D competitiveness cluster, Mov'eo, created in 2006.



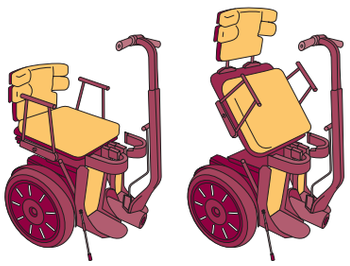
<vedecom.fr/en>

START@SYSTEMX FOR MOBILITY

SystemX, a UPSaclay partner, launches the innovation initiative START@SystemX to give startups the opportunity to take advantage of the institute's innovation momentum by joining key accounts and technology providers. The first season is about mobility and the call for applications ends in November.

<start-systemx.fr/>

A new kind of wheelchair



GYROLIFT is a unique revolutionary wheel "chair" that enables people with reduced mobility to stand. Based on the Segway technology and built by Lambert Trénoras from Université de Versailles Saint-Quentin-en-Yvelines, a UPSaclay member, in collaboration with Handipode and ERDF, it has already won many prizes and is currently under approval. After a medical evaluation, it could be commercialized in 2017.

<gyrolift.fr>

How to plan your journey

André de Palma from ENS Paris-Saclay, a UPSaclay member, and his team build dynamic transportation models, taking into account all our day to day behaviors: for example, everybody wants to optimize their own perceived travel time and arrive on time at destination, but individuals typically choose sub-optimal solutions. Traffic also depends on incidents, accidents, regulation, flexible or staggered schedules, etc. With the Grand Paris Express coming soon, the fully dynamic METROPOLIS simulator can also show us that travel time variability is as much a key as travel time, or that a bit of congestion is necessary to maintain equilibrium.

Publication

· R Khraibani, A De Palma, N Picard, I Kaysi. A new evaluation and decision making framework investigating the elimination-by-aspects model in the context of transportation projects' investment choices. Transport Policy, 2016

ROULETABILLE

A mobile app offering a swap shop for route maps and spare parts for antique bikes and mopeds.

UPSaclay member:
· ENSTA ParisTech

CYCLON

Inexpensive and removable blinkers for bikes, to improve cyclists' safety on a daily basis.

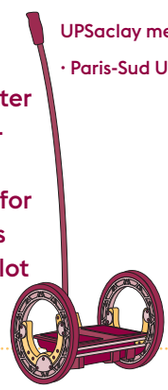
UPSaclay member:
· Institut d'Optique Graduate School

<cligniogs.wix.com/cyclon>

HUBLEX

A new generation of single-seater electric vehicle, called a gyropode, for professionals who move a lot indoors.

UPSaclay member:
· Paris-Sud University



<hublex.fr>

OuiHop'

A ride-hailing app for short distance that connects the pedestrian with car drivers passing nearby and going in the same direction.

UPSaclay member:
· Paris-Sud University

<ouihop.com/>

Keywords

Pedagogy,
Environment,
Biodiversity

Title

Soon on the Saclay plateau

the digital pedagogy of CentraleSupélec

© OMA

The engineering school will move to the Saclay plateau in September 2017. To accommodate students, researchers, teachers and administrative personnel, a set of 3 scalable buildings (the existing Supélec building included) constitutes a real city. Part of the facilities will be shared with neighbouring universities and schools, all Université Paris-Saclay members, including a learning centre for languages and sports facilities. All the departments and students were involved in the definition of an architectural project that enhances interactions between communities and in line with pedagogical developments. Indeed, the campus will provide the best tools and equipment for innovative and resolutely digital teaching: scalable classrooms, online and international courses, etc. Students will be at the centre of their learning process and masters of their customised program.

<centralesupelec.fr/?lang=en>

© Annette Gigon/Mike Guyer Dipl. Architekten - Architron

Rapid buses

© Alban Barthélemy

To promote environmental issues, Université Paris-Saclay stimulates environmentally-friendly behaviors and ideas. The region shares this interest: a dedicated bus road has been installed on the Saclay Plateau. The bus serves a number of UPSaclay members (Onera, ENSTA ParisTech, École Polytechnique, Inria, IOGS, Paris-Sud University, CentraleSupélec, INRA, CEA), while avoiding traffic congestion.

<bus-express-91-06.fr>

Discover the local biodiversity

© Service Environnement et Paysage/UPSud

The Botanical Garden of Paris-Sud University features a collection of rare species. The university is currently creating some free open thematic gardens. Moreover, educational walkways and hiking paths will be dedicated to the history of the ecosystems, to pollens and to the local biodiversity.

<u-psud.fr/en/university/botanical-garden.html>

TechWorm

Quantum physics has been found hiding in Schrödinger equation

"Igor Swiecicki from the University Paris-Saclay, France, and colleagues have shown a way to analytically solve a certain class of mean-field games."

<techworm.net/2016/04/quantum-physics-found-hiding-schrodinger-equation.html>

BBC

Is tech addiction making us far more stressed at work?

"Since January, Professor Michael Segalla has offered an iHealth activity and cardiac tracker to every MBA student at the HEC Paris management school."

<bbc.com/news/business-36517644>

BDAILY

STUDENTS INVENT FIRST DEVICE TO MONITOR WINE MATURATION

"The first portable device to monitor wine as it matures has been developed by a team of students from Université Paris-Saclay."

<bdaily.co.uk/entrepreneurship/30-03-2016/students-invent-first-device-to-monitor-wine-maturation/>

CPhIonline

If radiotherapy hurts your skin, it's genetic

"A team from Université Paris-Saclay have discovered a gene that makes some cancer patients more sensitive to radiotherapy. The discovery means that medicine could be personalised to save people's skin and continue treatment they may have stopped due to pain."

<cphi-online.com/if-radiotherapy-hurts-your-skin-it-s-genetic-news040308.html>

EXPRESS

SHOCK CLAIMS: Humans could be ALIENS from another galaxy brought to Earth by a comet

"The DNA that created the building blocks for life and created humans could have originally been bought from space on a comet that collided with

université PARIS-SACLAY

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IT HAPPENED

364 PhD students received their diploma at Université Paris-Saclay's first graduation ceremony on July 1st at Palais des Congrès de Versailles.

<universite-paris-saclay.fr/en/news/first-doctorates-awarded-to-candidates-at-universite-paris-saclay>

More than 800 students from primary, junior high and high schools in île-de-France presented their projects about water to the 14th "Faites de la science" regional contest Forum, on May 12th.

<faitesdelascience.fr>

Paris-Saclay Connexion, bringing toge-ther all the players in innovation (start-ups, SMEs, large companies and universities), was attended on July 5th by nearly 350 people and 39 Paris-Saclay ecosystem partners.

<paris-saclay-connexion.fr>

From August 23th to November 26th, UPSaclay took the road back to school with the Welcome Road, to meet with students and staff.

<universite-paris-saclay.fr/en/news/welcome-road-on-the-road-back-to-school>

WORTH READING

The Conversation

Heavy rain and climate change, how are they related?

In the context of the recent bad weather, we've been hearing in the media anything and everything on the relationship between record rainfall and climate change. How do we relate a rare event, linked to the meteorological situation, and changes over the long term?…

<universite-paris-saclay.fr/en/news/heavy-rain-and-climate-change-how-are-they-related>

Flow of ideas through the 19th century

Diana Cooper-Richet, researcher at "Centre d'Histoire Culturelle des Sociétés Contemporaines", talks about traffic ideas trough the 19th century, the case of journals and Parisian newspapers.

<universite-paris-saclay.fr/en/news/flow-of-ideas-through-the-xixth-century>

IN ISSUE #3

Science law,
3D viewing,
Electronics,
Archeology / Paleontology

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a **700** acres campus

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