

EDITORIAL ●●●●●●●●



Photo © François Gardy for the Institut Pasteur

Vincent Brignol
Project Manager - 'Pasteur
International Network' Association

Education, another strong link
within the Institut Pasteur
International Network

The directors of the Institut Pasteur International Network (IPIN), gathered in June at the 48th Council of Directors, and discussed new perspectives for education. First, the directors agreed to foster co-funding in the Calmette and Yersin program, to increase the number of full PhDs and to implement post-doc fellowships. Second, for stronger coordination of the 15 to 20 courses organized annually in the IPIN, [some strategic courses will now be organized on an alternating basis in Paris and in the Network.](#)

Moreover, members of the IPIN will strongly benefit from the creation of MOOCs by the Institut Pasteur. Not only should IPIN members soon have access to the seven MOOCs created in 2016 and 2017, but [they will now be systematically involved in all new MOOCs.](#) Furthermore, some MOOCs

CONTENTS



PUBLIC HEALTH AND COURSE OFFERINGS AT IP P2
 IN THE MOOD FOR MOOCS P3
 NEWS FROM THE PPU INTERNATIONAL DOCTORAL PROGRAM P4
 PARIS SCIENCES ET LETTRES PARTNERSHIP P5
 MOS(KIT)O, IGEN'S PROJECT FOR THE DETECTION OF ARBOVIRUSES P6
 COURSE OFFERINGS, ENROLLMENT 2016-2017 P7
 CALENDAR P7



The iGEM Pasteur Paris 2016 Team (partial group shown above) will compete with Mos(kit)o project, for the detection of arboviruses. Read the story on [page 6.](#)

could soon be recorded in the Network. Another enticing perspective for international education, the PanAfrican Coalition for Training in Research and Public Health (PACT) is anchored by the 10 institutes of the Network in Africa. Based on local needs, it will provide education tracks through research, in partnership with local universities. Finally, education and training are

structuring activities, facilitating the development of brilliant young scientists. The recent creation of the COMET (Committee Mobility and Talents) aims at nurturing new talents in the IPIN and will encourage more and more talented researchers to pursue their activities in the Network under the best conditions. ●



at the Institut Pasteur

by **Monica Sala, Executive Director for Education and Eliane Coëffier, Senior Project Manager: International Teaching and Training Program Calmette & Yersin, Fellowships, G4, Joint Units**

To respond to its strategic plan, the Institut Pasteur currently reinforces its international dimension and the role of public health within the institute. Out of 33 courses organized in 2015, 16 were on subjects related to public health, such as “Vaccinology,” “Tuberculosis” and “Modeling of infectious diseases.” 13 of these are part of the specialized Master's in Public Health. The Education Center of the Institut Pasteur is highly involved in these new orientations and is actively developing its course and workshop offerings in the field of public health. These efforts are illustrated by the organization of the “4th One Health Workshop,” and the “Vaccination and Public Health” workshop, as well as 4 new courses in public health during the 2016-2017 school year.

The first of these new courses, “**Infectious Disease Outbreak Investigation,**” organized by the Center of Global Health (CGH), is

intended for medical and public health professionals involved in field investigations of infectious disease outbreaks. Colleagues from the Institut Pasteur International Network (IPIN) have priority access to the course in order to support the goal of training a full-fledged Institut Pasteur outbreak investigation taskforce within the IPIN.

The second new offering, the “**Advanced Course on Antibiotics,**” relates to increasing resistance to antibiotics and the emergence of bacteria resistant to all drug classes which seriously threaten all branches of modern medicine. In addition to the “**Bacterial Resistance to Antibiotics Course**” held annually, the new course was created to provide advanced instruction on antibiotic discovery, development, and rational use. The course is a collaboration with the Pasteur Mérieux Foundation. A specific goal of this course is to bring leaders and innovators in academics and industry together with highly trained

scientists at the beginning of their careers.

The third new course launched this year, “**Viruses and Cancer**” investigates the links between some cancers and viruses in humans. Our growing knowledge of the role of viruses as a cause of cancer has led to the development of vaccines to help prevent some human cancers. Oncogenic viruses and the molecular mechanisms of virus-induced oncogenesis, as well as recent therapeutic approaches, constitute the subjects of this course.

The “**Innate Immunity and Infectious Diseases Pasteur Course,**” the fourth new addition to the 2016-2017 Institut Pasteur education line-up, seeks to describe the role of the innate immune system in a variety of infectious diseases, in order to better dissect the complex interactions between the host and the innate immune system.

On top of reinforcing public health, the Education Department (DDE) aims at better coordinating the course offerings at the Institut Pasteur in Paris and in the IPIN. To this end, several courses will be scheduled alternatively in Paris and in another institute of the IPIN, according to educational priorities identified in the Network (by the Directors, the Institut Pasteur International Network Focal Point for Trainings, the Education Department and the International Affairs Department). In this context, the “**Medical Entomology Course,**” taught for the first time in 2016 in Paris, will be organized in 2017 at the Institut Pasteur in French Guiana. It will then be taught in Paris in 2018 and in Cambodia in 2019. A MOOC

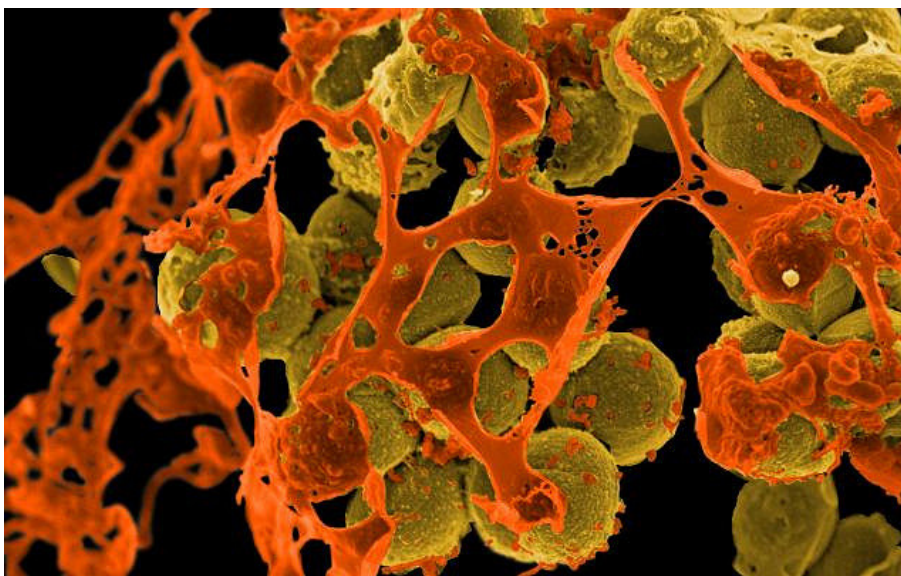


Photo © NIAID via Creative Commons

Methicillin-Resistant Staphylococcus aureus (MRSA) Bacteria Scanning electron micrograph of methicillin-resistant Staphylococcus aureus (MRSA, brown) surrounded by cellular debris. MRSA resists treatment with many antibiotics.

on Medical Entomology was created in 2016, including sessions from 5 institutes from the IPIN.

A MOOC will also be made from the "Innate Immunity and Infectious Diseases Course," planned to take place in 2017 in Paris. This course

will be scheduled at the Institut Pasteur in Cambodia in 2018. Starting in 2018, taking this MOOC will be a prerequisite to attending the course. The program of these courses will be adapted to the level of the public in each institute (Master, PhD, professionals) and to the public health

priorities of the hosting countries. Thanks to these new approaches, education hubs in specific fields will emerge in the IPIN. •



In the Mood for MOOCs

by Professor Dominique Franco

The Institut Pasteur has entered in 2013 a new era in education, illustrated by the production of the first Pasteur MOOC, in association with the CNAM, by Arnaud Fontanet on Concepts and Methods in Epidemiology (in French). This first MOOC was followed by a campaign of MOOCs, to foster digital learning within the institute. The Institut Pasteur is now keeping the pace in the production of MOOC.

To date, two additional Pasteur MOOCs have been broadcasted, one in Vaccinology (directed by Frédéric Tangy and Armelle Phalipon) and the other in Neuroscience, "From Neuron to Behavior," (directed by Pierre-Marie Lledo). The vaccinology MOOC drew 3,600 learners from 116 countries, and the neuroscience MOOC, which is still being diffused, has drawn more than 4,000 learners so far - a notable accomplishment for a specialized scientific MOOC.

MOOCs are now a distinguishing feature on the Pasteurian teaching landscape. A MOOC on Medical Entomology (directed by Anna-Bella Failloux and Vincent Robert) was recorded in March and will be diffused early in 2017. One on Advances in Stem Cell Biology (directed by Shahragim Tajbakhsh and François Schweisguth) should be recorded in October and one on Innate Immunity (directed by Jean-Marc Cavallion and Daniel Scott-Algara) is due to be produced in the early fall. At the end of this year, two additional topics are slated for their own MOOC recording: antimicrobial resistance and biomarkers in global health.



Illustration "1 MOOC" © Ilonka Hebls via Creative Commons

Concurrently, a Zika MOOC and a "One Health" MOOC are also being co-produced with the University of Geneva.

The CNAM studio will continue to record our MOOCs as long as a Pasteur MOOC "factory" is not built. Plans to build broadcast studio for MOOC recording are still in place, the opening of the studio is not expected before 2018. Collaboration with the CNAM has been very successful and strong ties have developed between the teams. The Pasteurian MOOC team has also built links with FUN, the French national platform, which hosts university-level courses. (FUN is the

MOOC platform of choice for most French Universities and schools.)

The exceptional number of Vaccinology MOOC learners coming from outside France, which reached almost 75% (especially from the United States and Australia) demonstrated the international potential of both the Pasteurian MOOCs and the FUN platform. Also, the Pasteurian MOOC team is in close contact with Campus France, the French agency in charge of promoting higher education and welcoming students in France, which has a mission to encourage this new way of teaching in France.

One of the goals of IP MOOC production has been to bring the strengths of the Institut Pasteur International Network to the forefront. To this end, all MOOCs produced by the Institute now include at least one teacher from the Network. Furthermore, at the next Network Symposium, a MOOC will be produced on its main topic, "From Basic Science to Biomarkers and Tools in Global Health," under the direction of Stanislas Pol (Center

for Translational Science) and Marie Vernet (IP Cameroun).

Although still relatively new at the Institut Pasteur, MOOCs recording within the Institute is already moving at a strong and increasingly fast pace. Additionally, with the MOOC-making process well established, more informal MOOC sessions are now possible, in a laboratory or outside. On a case-by-case basis,



MOOC sessions can now be recorded by a mobile team, in a laboratory of the Institut Pasteur or on various conditions for field studies, opening the way for future fascinating MOOCs. •

News from the PPU International Doctoral Program

19 students selected for October start; 2 new satellite programs launched

by Susanna Celli, MD, PhD, Dean of the PPU program

After a thorough selection process for the class of the PPU (Pasteur-Paris University) program that will start in October 2016, 15 students have been finally selected, an increase of 2 students compared to 2015. This rise in the number of students is not the only development in the PPU organization.

Indeed, in addition to the "classic" PPU, two satellite programs have been created this year: the PPU-EHME (Enhancing Mobility between Latin America & Caribbean and European Union in Health and Environment), and the PPU-CNGB (China National Biotech Group). These programs will bring the total number of new students to 19. The PPU-EHME connects the Institut Pasteur with a consortium of four Latin

American countries (Argentina, Mexico, Peru, and Uruguay), soon to be joined by Costa Rica. As for the PPU-CNGB satellite program, it was created thanks to a close partnership with CNBG, one of the largest pharmaceutical companies in China.

For the Institut Pasteur, both programs represent incredible help identifying the most motivated and able students in their respective countries. The PPU selection committee recruits the future students from a pool of candidates pre-selected by the Latin American countries and the pharmaceutical company. This process allowed us to enroll 4 motivated students for the 2016 class. Scientists from the Institut Pasteur with a deep knowledge on the Latin Ameri-

can and Chinese educational systems are involved in the screening of the candidate applications in collaboration with the PPU selection committee.

Next year, the call for projects for the PPU-EHME and for the classic PPU program will be concomitant. Each supervisor (principal investigator) can apply to both programs in July, to welcome a student from the PPU program in their research laboratory. The final decision is made in November only.

The PPU program has always strived to extend the benefits that PPU students enjoy to all students on campus as much as possible. The PPU steering committee is reflecting upon how to implement the latest changes and is considering



7th Annual Retreat of the PPU program, Morzine, May 18-20, 2016.

options to allow doctoral students who are not participating in the program to enroll for some PPU courses. We believe the extension of these courses, very popular among our students, would benefit all PhD students. However, our courses require very active participation and interaction from the students, so

that it is essential to maintain a limited number of participants for course effectiveness. The creation of additional classes would address this challenge, but would require support from additional scientists. We are confident that we will find colleagues on campus who are enthusiastic about sharing their time



with us, furthering the essential values of teaching and transmitting knowledge to tomorrow's scientists. •

Paris Sciences et Lettres

The Institut Pasteur joins Paris Sciences et Lettres (PSL) Research University for Innovative Interdisciplinary Research and Teaching

by Simon Legendre, Advisor to the President, Strategy and Partnerships

In May of this year, the Institut Pasteur became an associate member of Paris Sciences et Lettres Research University (PSL), an association of 25 prestigious self-governing academic and research institutions. This partnership builds on the strong existing links between the Institut Pasteur and several PSL member institutions (including Institut Curie, Ecole Supérieure de Physique et de Chimie Industrielle de la Ville de Paris, and École Normale Supérieure - Paris) as well as on the excellence in the field of biology of its member institutions, which include INSERM, the CNRS and Collège de France.

Beyond encouraging mutual innovative research projects, the Institut Pasteur hopes to reinforce its joint educational activities with Paris Sciences et Lettres, whose students will be welcome at Institut Pasteur courses. Thanks to this partnership, the Institut Pasteur and PSL will also be able to develop common interdisciplinary courses of the highest quality. For example, the Institut Pasteur will be a strong partner of the new Interdisciplinary Master's in Life Sciences (IMaLiS), a joint Master's program conducted by the ENS. The Institut Pasteur will create new M1 courses of the Imalis Master's, in partnership with the ENS, and open its M2 courses to students from this program. Similarly, new Master's curricula will be proposed, such as the compelling multidisciplinary Master "Chemical Frontiers of Living Matter," a curriculum at the crossroads between chemistry and biology,



Signature of the agreement between Institut Pasteur and PSL - Thierry Coulhon, president of PSL University (right) and Christian Bréchet, President of the Institut Pasteur (left).

proposed by eight members of Paris Sciences et Lettres.

The Medicine/Science Program (which unites Ecole Normale Supérieure, Institut Curie and Institut Pasteur, with the support of PSL) gives students access to new forms of education, as well as new host laboratories, and thus perfectly illustrates the benefit of the PSL partnership.

Close involvement with student entrepreneurship is also planned, in particular within the PSL-Pépité hub, and including industrial and/or institutional collaborations. The PSL partnership also offers Institut Pasteur the opportunity to associate itself with the PSL-ITI pre-doctoral program which is unique in France and enables the best scientists to acquire the skills needed to

compete as future start-uppers.

With this move, the Institut Pasteur positions itself aptly in the reshaping and consolidation of the French higher education landscape, an evolution that is illustrated by the creation of several major poles (known as COMUE, Communautés d'Universités et d'établissements or Association of universities and higher education institutions). Integrating universities and grandes écoles, these COMUEs develop many innovative interdisciplinary programs and may draw increasingly substantial financial resources from public authorities: therefore, they are essential partners for the Institut Pasteur in the future.

This new alliance is in keeping with the Institut Pasteur's strategy to open the institute to new academic partners. In this context, the Institute will soon establish links with other COMUEs in the Île-de-France region, such as Paris-Saclay or Sorbonne Universités. •

Additional coverage of this partnership:

[BIP article \(EN\)](#)

[BIP article \(FR\)](#)

[Press release \(FR\)](#)



project for the detection of arboviruses

by **Deshmukh Gopaul**, Head of the Pre-Doctoral Programs and M2 Master students **Claudia Gestin-Vilion**, **Victoire Le Chevallier**, and **Victor Lépine**

iGEM is an annual international competition in synthetic biology that has been organized by the iGEM Foundation (international Genetically Engineered Machine) since 2004. The Institut Pasteur took part in the competition for the first time in 2015 with its Plasticure project. The aim was to degrade plastics (Polyethylene terephthalate-PET) and then to use the by-products to generate an antibiotic: Erythromycin A. The 2015 team was mostly composed of second year students, and scored a bronze medal at the competition.

For the 2016 competition, which will take place at the end of October, a multidisciplinary team was assembled with 22 students from the Paris area. The members of the team are undergraduate and graduate students (from 3rd year of bachelor to the second year of Master), specializing in design (Ecole Nationale supérieure de Création Industrielle), intellectual property law (Université Paris Sud), chemistry (Ecole Supérieure de Physique et de Chimie Industrielles), and biology (Université Pierre et Marie Curie, Université Paris Diderot, Columbia university NY, Lycée de la Vallée de Chevreuse, and l'Ecole Technique Supérieure du Laboratoire). The variety of schools and universities

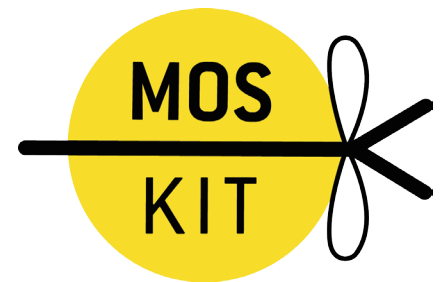
of the students and of their specialization is a formidable asset for this young and innovative team.

This year's project, Mos(Kit)o, aims to create a new way of monitoring the evolution of arboviruses (viruses that are vectored by arthropodes) such as Zika, Chikungunya, or Dengue, which cause deadly epidemics. To achieve this, the iGEM team will build an innovative device that will allow the detection and then the mapping of the spread of the viruses, thus providing administrative and health authorities with helpful information on the location of infected mosquitoes. This will enable a reduction in the use of insecticides, which harms the environment and leads to the development of drug resistance among insects.

The team's work started in January 2016, with brainstorming sessions to find the project theme, followed by bibliography sessions during the Spring. By early June, the construction of the biosilica-based material, used as a support for the virus detection system, started through laboratory practice. The students also participated in several events such as the 2016 Zika Summit where they presented a poster. Finally,

they took part in a debate game on synthetic biology at a Parisian University campus in Bobigny. A debate was then organized with the students to help them get a better understanding of the matters at stake in the field of synthetic biology, from a scientific perspective, but also regarding intellectual property law and societal aspects.

The iGEM project brings scientific ideas together in a responsible manner regarding research practices and ethics. The students can benefit from a training that familiarizes them with various aspects of research, including conception of ideas, financing, valorization and communication of ideas to society. Now an important part of the pre-doctoral programs of the Institut Pasteur, the iGEM project has started under the best auspices! •



A CUSTOMIZABLE BIODETECTION SYSTEM

iGEM Pasteur Paris 2016 Team (partial)
1st row from Top: Guillian Graves, Patsy Polston, Axel Lagnau
2nd row from top: Mélanie Lorin, Xavier Montoy, Victor Lépine, Mehdi Morel, Charlène Guillaume
3rd row from top: Claudia Gestin-Vilion, Victoire Le Chevallier, Mélanie Dumay, Lisa Dehove, Deja Robinson
4th row from top: Mathieu Hubert, Marina Maletic, Hanifa Bouziri, Cindy Hammamouche, Deshmukh Gopaul
Not present: Azra Abdul Kader, Benoit Beliard, Christophe Buherne, Marie Camman, Audrey Delots, Javier Ivan Castillo, Svetlana Ivanhof, Lise Hunault, Vincent Legros, Thomas Vialon



► [Enroll now for 2016-2017 Pasteur courses](#)



NEW COURSES 2016-2017

Click course to read full description online

[Viruses and Cancer](#)

[Retroviruses](#)

Innate Immunity in Infectious Diseases

► [Go to all courses](#)



ONGOING COURSES

Click course to read full description online

[Advances in Stem Cell Biology](#)

[Frontiers in Biological Psychiatry](#)

[Integrative Structural Biology](#)

[Advanced Course on Antibiotics \(AdCab\)](#)

► [Go to all courses](#)

Calendar: Education Events

SEPT 6



Creating Your Own Company Breakfast Meeting

with Antoine Prestat, Co-Foundern and CEO of Pep Therapy

8:30-10 a.m. Registration is required. Please contact Lisa Riffaud at lisa.riffaud@pasteur.fr

SEPT 12-16



Summer School 2016 in Metagenomics [read more](#)

4-day workshop for researchers and students

OCT 4



Creating Your Own Company Breakfast Meeting

with Philippe Gennes, CEO of Oncodesign

10-11:30 a.m. Registration is required. Please contact Lisa Riffaud at lisa.riffaud@pasteur.fr

NOV 8



Creating Your Own Company Breakfast Meeting

with Florence Séjourné, CEO of Davolterra

8:30-10 a.m. Registration is required. Please contact Lisa Riffaud at lisa.riffaud@pasteur.fr

DEC 7-9



Améliorer la mise en oeuvre de la politique vaccinale [read more](#)

Workshop at the Institut Pasteur

DEC 16



Graduation Ceremony at 3 p.m. [read more](#)

All PhD students who will have defended their theses between December 2015 and December 2016 at the Institut Pasteur are invited to participate in the ceremony. As was the case last year, four to five PhD students from the Institut Pasteur International Network will be honored at the ceremony. (Recruitment by the International Affairs Department is ongoing.)

DEC 19



Creating Your Own Company Breakfast Meeting

with Stephane Bancel, CEO of Moderna

8:30-10 a.m. Registration is required. Please contact Lisa Riffaud at lisa.riffaud@pasteur.fr

◀ CONTENTS



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Practical work for the "Medical Mycology" course in April, 2015. For current course listings, see [page 7](#).

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