

“Training and research
in *Listeria*
monocytogenes
adaptation through
proteomic and
transcriptome deep
sequencing analysis”

Newsletter n°4

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LIST MAPS



Editorial

At the beginning of 2018, I would like to take this opportunity to wish you the best. This year opens up with exciting new horizons for the network.

Indeed, two major network wide events will be landmarks of this third year of activity. In April, List_MAPS organises an international symposium. It will address the biology of foodborne pathogens in the continuum from outdoor environments to the consumer and infection. This event is designed to facilitate interactions between early stage researchers and senior researchers interested in the field. It will be a forum to present the latest advances and exchange opinions.

While already in their third PhD year, it is already time for the ESRs to programme the next step of their scientific career. The third workshop has been designed to further provide ESRs with the complementary skills that will optimise their job prospect in academia and in the private sector. It is a follow up of the online course that the ESRs attended on entrepreneurship and for which business plans were delivered.

Enrolling in a PhD programme has always been demanding and a constant is that time seems to go too fast! PhD viva and graduations are now just around the corner. Further experiments, paper writing, scientific dissemination and eventually thesis writing will be on the menu.

In conclusion, many things are ahead of us and I am looking forward to these exciting new developments.

Dr Pascal Piveteau,
Coordinator



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OVERVIEW OF THE 2nd YEAR

During the second year of operation, the network has been working hard. **Research programmes are going forward at a very good pace.**

Transcriptomics and proteomics data have been produced. This is central in the overall scientific program of List_MAPS. Protein extraction from most scheduled experimental conditions was completed and the relevant proteome analyses were finished by December 2017. Regarding transcriptomics, the database has been developed. A very comprehensive set of phenotypic data have been produced (soil, biofilm, intraspecific diversity, metabolism, light, regulation mechanisms) and the individual projects are progressing well.

Two aspects of the link between environmental cues and onset of virulence have been under thorough investigation. (i) The consequences of a fat diet on the success of infection has been investigated in the murine model; high fat diet resulted in an increased susceptibility to *L. monocytogenes* and has a major impact on the overall intestinal ecosystem. (ii) The chitinolytic system of *L. monocytogenes* is under complex regulation probably involving several regulators and in connection with the available carbon sources.

The link between intra-specific diversity and persistence has been addressed on a large collection of *Listeria monocytogenes* food isolates. Sessile growth has been under thorough investigation. As expected, phenotypic diversity was evidenced. *In silico* analyses are ongoing. Other phenotypic traits are under investigation.

New pathways of regulation are under scrutiny. Digging into these complex mechanisms is required to fully understand the astonishing capacity of *L. monocytogenes* to cope with many diverse habitats. This task requires the contribution of experts from several fields including microbiologists, molecular biologists and mathematicians.

By the end of the second year of operation, List_MAPS was represented in 4 international and national conferences (ISOPOL, FEMS, RNB, SMMAP) for a total of 16 poster presentations and 1 oral presentation. Two reviews have been published in international peer-reviewed journals, one original results paper has been published and several have been submitted. The network will pursue its scientific dissemination in 2018. The organisation of the List_MAPS Symposium in April 2018 is a great opportunity to present the work of the network. The ESRs are directly involved in the scientific organisation of this event. The purpose of the symposium is of course to present the latest developments regarding the biology of foodborne pathogens from outdoors to infection, but it is also designed to encourage mutual scientific interactions between ESRs and experienced researchers. No doubt that it will be another milestone in the scientific career of the List_MAPS ESRs.

OUTREACH ACTIVITIES AND EVENTS

RESEARCHERS' NIGHT 2017 (Bohyung and Ibrahim)

This year's activity was called "Le bouche à oreille de la recherche", where I had only **30 seconds to simplify my research project to an audience** and then s/he explains to someone else also in 30 seconds and **after 6-7 exchanges, the last one explains what he heard, and we compare that to what I originally said**. This year's theme was "The impossible", what is impossible in research and whether it is imposed by nature or defined by man, temporal or permanent, global or local, universal or cultural, historical or even political. It was very useful to interact with different kinds of audiences with different backgrounds but they all share the same passion for science and **it was quite amusing to explain and share our interests in science with everyone in a fun and non-formal way**. I am looking forward for the next outreach activity". **Ibrahim SULTAN (ESR 9)**



They held a very successful event like last year! We participated to "Le bouche à oreille de la recherche". There we found **how the information would transfer by time explaining in 30 seconds from a person A to B and B to C and so on**. It was interesting that some information were distorted meanwhile people also interpret the subject in great depth in such a short time. I participated in "Speed searching" which is to **introduce my project to a person in 5 minutes**, where I could get to present the importance of my project. It was great time to interact people from other fields. **Bohyung LEE (ESR 11)**



http://ec.europa.eu/research/mariecurieactions/about/european-researchers-night_en

<https://nuitdeschercheurs-france.eu/>

KULTURNATTEN (Miguel)



Culture night has run in Copenhagen for over 20 years. It is the moment of the year to connect with all kinds of public in a festive evening, and the city works together to inspire and create joy to all Copenhageners and visitors. **Parks, museums, theaters, universities and other work places are open to share a bit of their daily passions.**

I happily took part of it in my department this year. What a great surprise it was! **From children to old, I tried my best to make them understand a bit of my research.** Children wondered whether *Listeria* would eat cars or lions and adults cared more about how to consume their food products more safely. I even met a girl that had a mild infection of *Listeria monocytogenes*! I was very glad to have met her. The interaction of me and people, including this past *Listeria* patient, makes my work all worth it. Cannot wait for next year! **Miguel Villoria Recio (ESR3)**

<https://www.kulturnatten.dk/da/Kulturnatten>



OUTREACH WITH PATHSENSE ETN (Amber and Catarina)

The aim of the PATHSENSE outreach activity was to **disseminate information regarding the research of the PATHSENSE network** to the general public, while in a public setting as opposed to the more formal setting of the Researchers' Night. This was tricky to do because you are not surrounded by an audience with an interest in science, instead **you have to try to catch peoples' attention and interest.** In the end **we did manage to speak to a large group of people of a huge variety of ages.** I think by doing the outreach in this way, a lot of the people that we spoke to were **probably people who wouldn't necessarily attend a formal outreach event, so therefore we reached a wider audience.** I hope that we whet the interest of inspired some of the people we spoke to, and have inspired them to look into attending formal outreach events. The biggest challenge was definitely trying to get people to stop and speak with us, as I think most assumed that we were trying to get them to give money to something! **Amber Dorey (ESR4)**

This year I joined the PathSense's outreach activity called "Science on the Streets". During this activity we all went to the most crowded streets on Galway city and **disseminate our research to the passers.** It was **very challenging** to attract people to stop and chat with me about science for a couple minutes though many did and **they were all very curious** and concerned. **It was a great experience to share our findings** with such a sympathetic public as the Irish people. **Catarina Marinho (ESR8)**



<https://twitter.com/PATHSENSE2017>

WORKSHOP AND ANNUAL MEETING



Monday 9th: visit of CHR. Hansen



Thursday 12th: presentation of the individual sub-projects

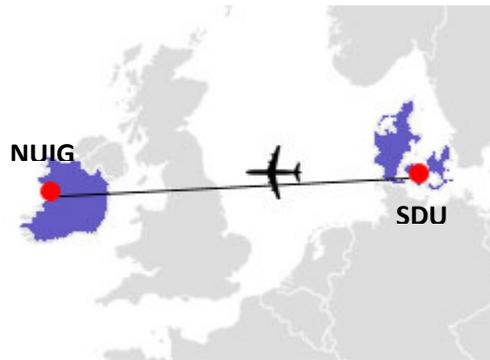
From 9 to 11 October 2017, ESRs went to Copenhagen for the 2nd scientific workshop of the project organised by UCPH, Department of Veterinary and Animal Sciences with the collaboration of INRA team MaIAGE. They visited a major food company, ChrHansen on Monday and attended training on system biology.

After the workshop, the ESRs and the partners met for the 2nd annual meeting of List_MAPS from Wednesday 11th afternoon to Thursday 12th. One year before the end of the project, it was a real opportunity to see the results and progress of every sub-project and discuss what have to be done for the 3rd and last year.



Wednesday 11th: dinner in Copenhagen

SECONDMENTS



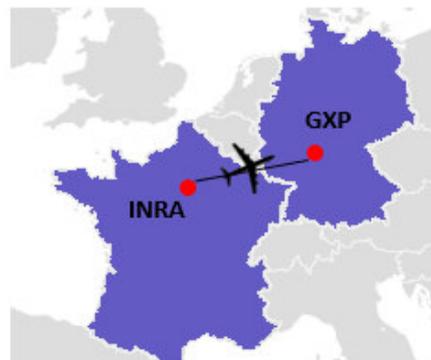
ESR7 Patrícia DOS SANTOS

From: University of Southern Denmark (SDU)
To: National University of Ireland, Galway (NUIG)
Dates: 31/07/17 to 08/09/17

“ This experience of going to NUIG was quite exciting because **I had the chance to get to know another country/city and another lab.** Going to an English-speaking country made me feel a bit more relaxed, however you can find some funny accents. But in general, this made my experience easier every time I was shopping or I needed to ask for some direction. Even though I went to Galway during the summer, the weather decided to trick me and I jumped directly to autumn season. But since I was coming from Denmark that did not scare me at all! Workwise, the lab was a bit different from my lab and I had to adapt to new rules and new ways of doing things. **It was interesting to see the different routines in the lab** and this is for sure an enriching experience! Regarding the work performed, **I definitely gained with this chance of learning and applying new methods.** I could perform experiments that I wouldn't be able to do in my lab and therefore I obtained some exciting results. The experience was positive, I learned, I got some new results, and **I had the chance to collaborate with other members of List_MAPS.** ”

ESR9 Ibrahim SULTAN

From: National Institute for Agricultural Research, unit MaIAGE (INRA)
To: GenXPro (GXP)
Dates: 31/07/17 to 25/08/17



“ The experience of the secondment was useful on many levels. Changing the working place from a research institute and **going to another lab in a company helped me to see research from a different point of view** and was a good chance to have **a closer look on the research and development field inside companies.** Spending a part of the PhD inside a company allowed me to get in touch with the practical applications of the field of bioinformatics and was **an opportunity to share knowledge and experience with the other ESRs** who have different research background, integrating statistical, Informatics and biological backgrounds was an important key point of the secondment. On a personal level, living in another country different than your home country and your residence country is quite useful for widening the social prospective. It helps to realize and appreciate many things that someone may take for granted. **I did enjoy many of my times there learning about Germany in general and Frankfurt in particular,** I had the chance to travel a bit inside Germany during the weekends to maximize the benefits of discovering the country while I am staying there. ”

ESR5 Tiago SANTOS

This is your last year in Clermont-Ferrand in France, will you miss the city after the end of your contract?

For sure I will miss this region, from the breathtaking landscapes and mountains to the kind and friendly people that welcomed me. Everyone that visits Clermont and the Auvergne region is enchanted by its mountain ranges and dormant volcanoes. The Puy de Dôme (the one on the top left of the photo) is the highest volcano in the region and its postal card. The city of Clermont was the home of mathematician Blaise Pascal, but its most famous landmark is the religious architecture, in notably the Clermont-Ferrand Cathedral.



It wasn't my first visit to France, but it was the first time that I moved out from my home country to live in another one. The main challenge, in the beginning, was the need to communicate in French, but it disappeared with some French courses, and now it's even rewarding the exchanges that I've with my colleagues. The feeling of *saudade* from family and friends was also hard to overcome, the term in Portuguese that represents the deep emotional state of nostalgic for an absent someone that one loves. With the help of some lovely people that I met in INRA, this feeling was surpassed.

Even if your work is time-consuming, do you manage to have free time and do activities outside the lab?

The task of doing a PhD is demanding, though there is always time for other pleasure activities. Together the Monts Dore and the Chaîne des Puys include 80 volcanoes, so one of my favourite outside activities is hiking with friends, followed by a nice *truffade* (the region famous dish) and a friendly beer. I also try to discover, as much as possible, new cities and countries and this network allowed me to do precisely that, just during this current year I visited nine different countries. Badminton as a leisure sports activity during the lunch break has been a joyful activity.

You will have your two secondments during this final year, how will they help you in your work?

My PhD project has a focus on proteomic approaches and is divided in three main chapters. For the first two, I had all the required tools at my disposal in INRA at Saint-Genès Champanelle, especially its well-equipped proteomic platform. Now it is time to focus on the third chapter, for that the two secondments will be vital not only to obtain more data but also to have a contact with new techniques and discover new work environments and ways of doing science.

Your PhD thesis' defence is in one year now, how do you feel about that?

It has been two full, demanding years of PhD, with plenty of obstacles to overcome but I am in the right track to reach well prepared to my PhD defence that should be at the end of the next year. In the approaching last year, the stress of getting the lab data decreases but it increases the pressure of lack of time and the need of writing, the papers and the thesis. But as I mentioned before, the two first chapters are well advanced and the time that is left will be enough to publish high-quality manuscripts and also writing a proper thesis. Every PhD project has a touch of innovation, of something never done before, and mine was not the exception. The first year was very laborious and sometimes frustrating, with the need for protocol optimisation and getting familiarised with new techniques. On the plus side, I am still working with my favourite omic, proteomics, with the study of proteins and the application of different mass spectrometry approaches to microbial studies.

ESR11 Bohyung LEE

You are pursuing the 2nd half of your PhD in Germany, after living in France, which differences have you noticed in your daily life?

In France, I stayed in a small village near Clermont-Ferrand where only 2,000 habitants reside and it seemed like I was the only Asian there. I could feel many eyes following behind me whenever I walked in the town. In contrast, Frankfurt is a metropolis where a lot of immigrants or expatriates of diverse ethical backgrounds are living. I often hear different languages spoken in public transportation, restaurants, and streets which in general makes me feel more comfortable as a foreigner. Since there are a lot of people like me temporarily residing in Frankfurt for study or work, English is widely accepted in daily life and I confront less language oriented difficulties for example, in public offices or supermarkets than in France. In France, I was in a beautiful countryside called Auvergne where I could find various hiking tracks in volcanic mountains. I also enjoyed sophisticated French foods, saying 'Bonjour' to each other and harvesting seasonal fruits or mushrooms in nature. In Hesse, where Frankfurt is located, there is no much nature, unfortunately, and as a big metropolis, I found that people are less relaxed.



When you have free time, do you sometimes go back to your home country?

Korea is located in far East Asia so it's not possible to visit only for short period because it takes 11-12 hours by direct flight not to mention the price of flight tickets. Also, because I am in the last year of my contract, I can't easily plan a long holiday to home at the moment. It's been 8 months since I visited my family last time and I miss my home, family, and friends a lot. Moreover, I got a niece a month ago and I really wish to see her soon. Frankfurt has one of the biggest airports in Europe and it offers direct flights to numerous destinations almost every day. I like to travel, therefore I try to visit more places during weekends because it's an unique opportunity to be in the middle of Europe with access to other countries/cities with a short flight. I often visit France, Spain, or Netherlands for weekends.

You are in a joint supervision, can you explain why and how this would help you for your career?

In BioFilm Control (BFC), I studied biofilm formation of various *Listeria monocytogenes* strains under specific conditions to deepen the understanding of their behavior in food processing premises and for that I utilized BFC's special technique called Biofilm Ring Test. One interesting experience as an employee of BFC was to promote the technique in a conference in USA by giving an oral presentation of BFC's one successful project. It was a great success in showing the potential application of the technique in drug development for pharmaceutical companies. It was very rewarding to help the company by being responsible for the talk, answering questions, and meeting the prospective customers.

In GenXPro, my project is to develop an in silico virulence assay of *Listeria monocytogenes* by RNAseq to identify potential target genes. For the last half an year, I have tried various approaches to make RNAseq more affordable, and even though I couldn't succeed in making a protocol substitutable for costly kits, I learnt how a new kit would develop in a company for sales. In a few months, I will be able to learn the whole process of RNAseq from library construction and bioinformatics to analyze data which will finally enable the development of an in silico assay that could be useful for food-born-disease controlling agencies.

This is the last year of List_MAPS and your PhD. There are still events to come but what did you learn from this research experience?

I have gained much soft skills such as communication, independency, and cooperation as well as scientific techniques during the last 2 years of my project. Most of all, I learnt how to push forward a project by myself. Performing a PhD in a private company can be difficult if the project doesn't bring much benefit to his/her hosting company. In the end the main job of a PhD student is to publish academic papers which a company may not be interested in if those works won't profit them. Being in the last year I am on the one hand very nervous with the approaching deadline of my project because there are still a lot of experiments I want to perform in time to publish more papers, however, on the other hand I am excited to finish this chapter of my life no matter I will succeed or not. I enjoyed a lot the trainings offered by List_MAPS, including outreach activities like Researchers Night. I specially appreciate the networks of our ListMAPS groups where ESRs, PIs and the manager help with troubleshooting of technical difficulties, administrative points for non-European students as well as emotional supports for each other.

DISSEMINATION

Save the date! Our symposium is on Thursday 26th April 2018

(click on the image to have more details)



Training and research in Listeria monocytogenes adaptation through proteomic and transcriptome deep sequencing analysis

International Symposium

Foodborne pathogens: from farm to pharmacy !

Thursday 26th April 2018
Acton's Hotel Kinsale, Ireland

Preliminary programme

08:30-09:00	Registration
09:00-09:10	Introduction
09:10-10:50	Session I Biodiversity, keynote speaker Sylvain Brisse and offered talks
10:50-11:10	Coffee break and poster session
11:15-12:12	Session II Habitat colonization, offered talks
12:15-14:00	Lunch and poster session
14:00-16:00	Session III GI tract and infection, keynote speaker Jörgen Johansson and offered talks
16:00-16:15	Coffee break and poster session
16:20-17:40	Session IV Regulation, offered talks
17:40-18:30	Poster session

Keynote speakers

Brisse Sylvain, Institut Pasteur, France
Johansson Jörgen, Umea University, Sweden

Registration and details

12/02/2018 deadline for abstract submission
16/03/2018 deadline for registration

<http://blog.u-bourgogne.fr/list-maps/conference>

List_MAPS partners











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In collaboration with EFB 

EVENTS AND MEETINGS

23-25 April 2018: Microbial Stress conference in Kinsale

<http://www.efbiotechnology.org/microbialstress/>

26 April 2018: List_MAPS conference in Kinsale, <http://blog.u-bourgogne.fr/list-maps/conference>

02-04 July 2018: workshop 3 in France

SECONDMENTS

ESR1: Maja (UB) to UCC

ESR3: Miguel (UCPH) to UCC

ESR4: Amber (NUIG) to UB

ESR5: Tiago (INRA MEDIS) to UB

ESR7: Patricia (SDU) to UB

ESR8: Catarina (NUIG) to WUR

ESR11: Bohyung (GXP) to LSG

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Website: <http://blog.u-bourgogne.fr/list-maps>

List_MAPS Consortium



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