Curriculum-vitae

Nguyen Phuong PHAM, Ph.D.

Areas of Expertise: Genomics – Bioinformatics – Microbiology – Microbial ecology – Molecular biology

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PROFESSIONAL EXPERIENCES

2024-now **Research associate**

Dr Marc Ouellette's Laboratory, the Infectious Disease Research Center (CRI), University Hospital of Quebec - Laval University Research Center (CHUL), Quebec, Canada

2020-2024 **Postdoctoral fellowship** "Functional genomics of antimicrobial resistance in *Streptococcus pneumoniae*"

Dr Marc Ouellette's Laboratory

Highlights: Identified and validated genetic determinants of trimethoprim (TMP) resistance in *S. pneumoniae*; developed machine learning models to predict TMP minimum inhibitory concentrations (MICs)

- Genomics: Conducted genome-wide association studies (GWAS), comparative genomic, and phylogenomic analyses
- Bioinformatics: Designed and implemented pipelines for genomic and metagenomic analyses, as well as machine learning workflows, using high-performance computing (HPC) infrastructure
- Functional study: Reconstructed antimicrobial resistance by whole-genome or targeted transformation coupled with sequencing (NGS, Sanger)

2015-2018 **Ph.D. in Microbial ecology** "Comparative genomic analysis of *Brevibacterium* strains and study of their biotic interactions with *Hafnia alvei* in a model cheese" – **BreviCheese project**

Food Process Engineering and Microbiology Unit (GMPA), AgroParisTech – INRA, France

Highlights: Identified genetic determinants involved in the growth of *Brevibacterium* on the cheese surface; demonstrated a mutualistic interaction between *B. aurantiacum* and *H. alvei* in cheese

- Genomics: Conducted phylogenetic and orthology analyses, and reconstructed metabolic pathways from genomic data
- Functional study: Developed a lab-scale mini-cheese model and optimized RNA extraction protocol from cheese; performed microbial, biochemical, transcriptomic (RNA-seq), and metabolomic (LC-MS, HPLC) analyses

2015 **Master internship in Microbial ecology** "Comparative genomics of technologically relevant metabolic pathways in *Brevibacterium* and their role in adaptation to the cheese environment", **GMPA**

Highlights: Reconstructed amino acid catabolism pathways across the 20 *Brevibacterium* genomes; investigated the impact of methionine on growth and sulfur metabolism regulation in cheese associated strains

- Microbiology: Cultured *Brevibacterium* and conducted microplate growth assays
- Genomics: Performed genome sequencing, *de novo* assembly and functional annotation
- Molecular biology: Extracted and purified DNA and RNA; performed PCR, qPCR, and RT-qPCR

2013-2014 **Research assistant**, **Department of Pharmaceutical Industry, Hanoi University of Pharmacy (HUP),** Vietnam

- Participated in projects on probiotic protection *via* encapsulation and lyophilization, and on magnesium lactate production through microbial fermentation
- Supervised and monitored student practical work on ethanol production by *Saccharomyces cerevisiae* using a continuous fermentation system

2012-2013 **Undergraduate internship** "Bacteriocin production capacity of *Lactobacillus acidophilus* ATCC 4653", **HUP**

- Microbiology: Cultured lactic acid bacteria and extracted, purified, and characterized the bacteriocin produced by *L. acidophilus* ATCC 4653

EDUCATION

2015-2018 **Ph.D.** speciality **Process Engineering, Microbiology**

AgroParisTech, Paris-Saclay University, France

2014-2015 **Master** mention **Molecular and cellular biology** speciality **Microbiology**

Pierre and Marie Curie University (UPMC, Paris VI), France

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2008-2013 **Pharmacist Degree, Industrial pharmacy** specialization
Hanoi University of Pharmacy (HUP), Vietnam

COMPUTER SKILLS AND LANGUAGE

Bioinformatics **High-performance computing (HPC)**; **Database and Analysis platforms** (e.g. IMG/M, Galaxy, NCBI, EMBL-EBI, BV-BRC); **Programming languages:** Bash, Python, R; **Machine Learning frameworks:** scikit-learn; **Container platforms:** Apptainer, Docker

IT **OS:** Unix, Linux, Windows, macOS; **Microsoft Office Suite** (Word, Excel, PowerPoint); **Bibliographic management:** Zotero; **Version control:** Git

Languages **French**, **English**, **Vietnamese**

PUBLICATIONS

Abdallah, K., Fliss, O., Pham, N. P., Guay, L. D., Gingras, H., Godin, C., Leprohon, P., Biron, E., Fliss, I. & Ouellette, M. (2025). Antimicrobial Activity of a Synthetic Brevibacillin Analog Against Multidrug-Resistant *Campylobacter* spp**.** *International journal of molecular sciences*, 26(10), 4657. **Article.**

Peillard-Fiorente, F., Pham, N. P., Gingras, H., Godin, C., Feng, J., Leprohon, P., & Ouellette, M. (2025). Point mutations in functionally diverse genes are associated with increased natural DNA transformation in multidrug resistant *Streptococcus pneumoniae*. *Nucleic acids research,* 53(1), gkae1140. **Article.**

Pham, N.P., Gingras, H., Godin, C., Feng, J., Groppi, A., Nikolski, M., Leprohon, P., & Ouellette, M., (2024). Holistic understanding of trimethoprim resistance in *Streptococcus pneumoniae* using an integrative approach of genome-wide association study, resistance reconstruction, and machine learning. *MBio,* 15(9), pp.e01360-24. **Article.**

Telhig, S., Pham, N. P., Ben Said, L., Rebuffat, S., Ouellette, M., Zirah, S., & Fliss, I. (2024). Exploring the genetic basis of natural resistance to microcins. *Microbial Genomics,* 10(2), 001156. **Article.**

Pham, N.P., Patron, K., Gingras, H., Feng, J., Leprohon, P., & Ouellette, M., (2024). Déchiffrer la résistance au triméthoprime chez *Streptococcus pneumoniae* par une approche intégrative d'étude d'association pangénomique, de reconstruction de la résistance et d'apprentissage automatique. *4e Journée scientifique du Département de Microbiologie, Infectiologie et d'Immunologie, Faculté de Médecine, Université Laval, 2 November 2023, Québec, Canada.* **Poster**.

Flahaut, M., Leprohon, P., Pham, N. P., Gingras, H., Bourbeau, J., Papadopoulou, B., Maltais, F. & Ouellette, M. (2023). Distinctive features of the oropharyngeal microbiome in Inuit of Nunavik and correlations of mild to moderate bronchial obstruction with dysbiosis. *Scientific Reports,* 13(1), 16622. **Article.**

Pham, N. P., Landaud, S., Lieben, P., Bonnarme, P., & Monnet, C (2019). Transcription profiling reveals cooperative metabolic interactions in a microbial cheese-ripening community composed of *Debaryomyces hansenii*, *Brevibacterium aurantiacum* and *Hafnia alvei*. *Frontiers in Microbiology,* 10, 1901. **Article.**

Pham, N. P. (2019). Microbial adaptation in cheese: Tales of *Brevibacterium. Paris-Saclay MICROBES day, 27 March 2019, Gif-sur-Yvette, France*. **Speaker.**

Pham, N. P. (2018). Quels sont les mécanismes d'adaptation de *Brevibacterium* à l'environnement fromager? *Congrès National de la Société Française de Microbiologie, 1-3 October 2018, Paris, France*. **Guest speaker.**

Pham, N. P., Layec, S., Dugat-Bony, E., Vidal, M., Irlinger, F., & Monnet, C. (2017). Comparative genomic analysis of *Brevibacterium* strains: insights into key genetic determinants involved in adaptation to the cheese habitat. *BMC genomics,* 18(1), 955**. Article.**

Pham, N. P., Dugat-Bony, E., Vidal, M., Irlinger, F., Monnet, C., & Layec, S. (2017). Comparative genomic analysis of *Brevibacterium* strains: insights into key genetic determinants involved in adaptation to the cheese habitat and generation of functional properties. *The 14th Symposium on Bacterial Genetics and Ecology (BAGECO 14), 4-8 June 2017, Aberdeen, United Kingdom.* **Poster**.

REFERENCES

Dr. Marc OUELLETTE – Postdoctoral supervisor – **CHUL** – ✉ marc.ouellette@crchudequebec.ulaval.ca – ✆ +1 418-525-4444 # 48184

Dr. Christophe MONNET – Thesis supervisor – **GMPA** – ✉ christophe.monnet@inrae.fr – ✆ +33 01.89.10.11.49

Dr. Eric DUGAT-BONY – Member of thesis committee – **GMPA** – ✉ eric.dugat-bony@inrae.fr – ✆ +33 01.89.10.11.06

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