

**NANFACK MINKEU Ferdinand**

Molecular Virologist and Entomologist

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## **PROFESSIONAL EXPERIENCE**

**August 2022-Present: Visiting Assistant Professor at The College of Wooster, Wooster, USA.**

- Teaching introductory and advanced courses in general biology, molecular biology, and genetics/genomics
- Mentoring undergraduate student research for both underclassmen and senior theses
- Research on:
  - Mosquito surveillance and population genetics (DNA isolation, PCR and sequencing, Bio-informatic analyses)
  - Mosquito-borne viruses and evolution (RNA isolation, RT-PCR, RACE, qPCR, sequencing, bio-informatic analyses)

**May2020-August 2022: Adjunct Professor, Post-doctoral researcher and The College of Wooster, Wooster, USA.**

- Mentored of undergraduate student research
- Taught in introductory molecular biology laboratory sections
- Performed research activities on mosquito reproduction and viruses involving:
  - Literature searches and experimental designs
  - High Performance Liquid Chromatography/mass spectrometry and analysis of proteins
    - Microscopy techniques and PCR
    - RNAseq, RT-qPCR, and Bioinformatics

**August 2019-present: Consultant at International Institute for Tropical Agriculture (IITA), Cotonou, Benin.**

- Studying mosquito-borne diseases and arboviruses testing
- Analyzing and interpreting insecticide resistance and viral infections in mosquitoes
- Mentoring of graduate students

**July 2019-Feb 2020: Postdoctoral researcher at the Kansas State University, Manhattan, KS, USA.**

- Performed research activities on molecular characterization of viruses: DNA/RNA purification, qPCR, PCR, sequencing, RNAseq, cloning.
- Assessed interactions between endosymbionts and viruses: qPCR and statistical analysis
- Conducted bio-informatic analyses and RNAseq: Trimming (Trimmomatic), Mapping (Bowtie2, STAR, HISAT2), Differential expression (HTseq and DESeq2).

**April 2015-June 2019 / Scientist at the *Institut Pasteur* in Paris, France**

- Used molecular tools to characterize insect-specific viruses and arboviruses of malaria vectors.
- Designed primer for RNA interference, classical PCR and real time PCR (Taqman and SYBR Green)
- Carried out and analyzed sequencing RNA experiment
- Deciphered the evolution between insect specific viruses and arboviruses
- Cultivated and quantified viruses

**May-December, 2013 / Assistant Engineer at the University of Strasbourg, France**

- Produced transgenic and mutant malaria vectors using a new tool called the CRISPR/Cas9 mutagenesis through molecular Biology (Cloning, PCR), Immunology and genetic techniques (micro-injection, crossing species)

**April 2010-November, 2012 / Medical entomologist, Ministry of public health-Cameroon in the project entitled “Impact of insecticide resistance on the efficacy of LLINs in the North of Cameroon ”**

- Collected of Mosquito larvae and adults
- Dissected of adults and evaluated of parity rate,
- Performed ELISA and estimated infection rate of malaria parasites,
- Conducted Bioassays and evaluated of insecticidal and larvicidal effects of plants extracts.
- Wrote of SOPs and technical reports.

## **EDUCATION**

**2015-2018: PhD in Life Science Complexity, Sorbonne University, Paris, France.**

- PhD thesis on Anopheles viruses (RT-qPCR, RNAseq, de novo assembly of viruses, virus discovery and Evolution).

**2008-2011: Master’s degree in Biochemistry - Biotechnology and Development / Medical entomology, University of Yaoundé I, Cameroon.**

- Master’s thesis on malaria transmission: Mosquito collection, Bioassays, *Anopheles* identification, Parity, Infection rate (ELISA) of malaria parasites and *Anopheles* competence analysis.

**2005-2008: Bachelor’s degree in Biochemistry, University of Yaoundé I.**

- Electrophoresis, Chromatography, Biomolecule properties and structures, Nutrition

## TEACHING ACTIVITIES

### **August 2022-Present: Visiting Assistant Professor at The College of Wooster, Wooster, USA**

- Fall 2022: Taught Foundations of Biology (BIOL 111)
- Fall 2022: Taught Genes and Genomes (BIOL 306), upper-level class.
- Fall 2022: Taught Genes and Genomes Laboratory (BIOL 306)
- Fall 2022 & Spring 2023: Mentored two senior thesis students (BIOL 451 & BIOL 452)
- Spring 2023: Taught Gateway to Molecular and Cellular Biology Laboratory (BIOL 201)
- Spring 2023: Taught Genes and Genomes (BIOL 306), upper-level class.
- Spring 2023: Taught Genes and Genomes Laboratory (BIOL 306)
- Spring 2024: Taught Gateway to Molecular and Cellular Biology Laboratory (BIOL 201)
- Spring 2024: Taught Foundations of Biology (BIOL 111)
- Fall 2023 & Spring 2024: Mentored four senior thesis students (BIOL 451 & BIOL 452)

### **August 2020-May 2022/Adjunct at the Biology department of The College of Wooster, Ohio**

- Fall 2021: Mentored two senior thesis students ( BCMB-451)
- Spring 2021: Taught Gateway to Molecular and Cellular Biology Laboratory (BIOL 201)
- Spring 2021: Mentored two senior thesis students ( BCMB-452)
- Fall 2020: Mentored two senior thesis students (BIOL 451 & BCMB-451)

### **August 2020-May 2021/Assistant and tutor at the French department, The College of Wooster, Ohio**

- Spring and Fall 2021: Tutor of students.
- Fall 2020: Assistant during French Conversation FA20

### **August 2015-June 2016/Volunteer in language space: *Cité internationale universitaire* of Paris, France.**

- Taught French to non-native speakers and students by using conversation groups.

### **October 2010-October 2012/Assistant and tutor at the Biochemistry department/University of Yaoundé I, Cameroun**

- I taught graduate and undergraduate students biochemistry techniques:

- electrophoresis, chromatography, yogurt and jam fabrication.
- I was involved in the copy checking process
- I did practical works and directed works to under-graduated students
- Tutor in purification and separation techniques of biomolecules for graduated students

**January 2009- December 2012 /Responsible of health and Environment for AJAH 3000, Cameroon. Part time.**

- Organized meetings, seminar and training. Planned and researched lucrative projects. Elaborate and manage strategies for environment protection.
- Taught infectious, rare and metabolic diseases to local populations
- Organized workshops on the fabrication of hypochlorite sodium and food preservation.

## LANGUAGES

- Mother tongue **French**
- Other languages: **Italian (B1)** Written/Oral Proficiency Threshold Beginner

## PUBLICATIONS

- **Nanfack-Minkeu F**, Poelstra JW and Sirot LK. (2024). Gene Regulation by Mating Depends on Time, Diet, and Tissue Type in Female *Aedes Aegypti*. Preprint, <https://dx.doi.org/10.2139/ssrn.4883560>.
- Sandra Ateutchia-Ngouanet, **Ferdinand Nanfack-Minkeu**; Mavridis Konstantinos; Samuel Wanji; Maurice Demanou; John Vontas; Rousseau Djouaka. (2024). Monitoring of *Aedes* populations from Benin for arboviruses, *Wolbachia*, insecticide resistance status and mechanisms, in different Agroecosystems. *Acta Trop.*, 253:107178. doi: 10.1016/j.actatropica.2024.107178.
- Ilbeigi Khamseh Nejad M, Cappelli A, Damiani C, Falcinelli M, Catapano PL, **Nanfack-Minkeu F**, Mayi MPA, Currà C, Ricci I, Favia G. (2024). *Wolbachia* and *Asaia* Distribution among Different Mosquito Vectors Is Affected by Tissue Localization and Host Species. *Microorganisms.*, 12(3):545. doi: 10.3390/microorganisms12030545
- **Nanfack-Minkeu, F**; DeLong , A; Morgan, W. (2023). Complete genome of *Aedes japonicus* narnavirus from wild caught mosquitoes collected in Ohio, USA. *microPublication Biology*. 10.17912/micropub.biology.000909. PubMed ID: 37736247.
- **Nanfack-Minkeu F**, DeLong A, Luri M and Poelstra JW. (2023). Invasive *Aedes japonicus* mosquitoes dominate the *Aedes* fauna collected with gravid traps in Wooster, northeastern Ohio, USA. *Insects*, 14(1).

- Ateutchia Ngouanet S, Wanji S, Yadouleton A, Demanou M, Djouaka R and **Nanfack-Minkeu F**. 2022. Factors enhancing the transmission of mosquito-borne arboviruses in Africa. *Virusdisease.*, 1-12. doi: 10.1007/s13337-022-00795-7.
- Parsana D, **Nanfack-Minkeu F** and Sirot LK. 2022. Insemination status in *Aedes aegypti* and *Aedes albopictus*. *Cold Spring Harb Protoc.* doi: 10.1101/pdb.top107668
- Parsana D, **Nanfack-Minkeu F** and Sirot LK. 2022. Determining the insemination status of *Aedes* mosquitoes. *Cold Spring Harb Protoc.* doi: 10.1101/pdb.prot107954.
- **Nanfack-Minkeu F** and Sirot LK. 2022. Effects of mating on gene expression in female insects: unifying the field . *Insects* **2022**, 13(1), 69.
- Belda E, **Nanfack-Minkeu F**, et al. 2019. De novo profiling of RNA viruses in Anopheles malaria vector mosquitoes from forest ecological zones in Senegal and Cambodia. *BMC genomics*, 20:664.
- **Nanfack-Minkeu F**, et al. 2019. Interaction of members of the natural RNA virome with the African malaria vector, *Anopheles coluzzii*. *Scientific reports* 9 : 6319.
- **Nanfack Minkeu F** and Vernick K. 2018. A systematic review of the natural virome of Anopheles mosquitoes. *Viruses* 10(5), 222.
- **Nanfack FM**, Dongmo ZY, Fogang A. 2015. Les insectes impliqués dans les pertes post-récolte des céréales au Cameroun : méthodes actuelles de lutte et perspectives offertes par la transgénèse. *Int. J. Biol. Chem. Sci.*, 9(3) :1630-1643.
- Bigoga D Jude, **Nanfack M Ferdinand**, et al. 2012. Seasonal prevalence of malaria vectors and entomological inoculation rates in the rubber cultivated area of Niete, South Region of Cameroon. *Parasites & Vectors*, 5:197.

## OTHER SCIENTIFIC COMMUNICATIONS

- Domenick Barbo, Richard Yanagihara, Elysée Nchoutpouen, **Nanfack-Minkeu Ferdinand**, Esemu Livo. (2014). TRMD/MHIRT Abstract: Arbovirus Surveillance in *Aedes aegypti* and *Aedes albopictus* Mosquitoes in Central Cameroon.
- **Nanfack-Minkeu Ferdinand**. (2013). Mutant and transgenic anopheles: the missing tools for Malaria vector control. PAMCA essay membership.

## BOOKS

**Nanfack-Minkeu Ferdinand. (2021).** Moustiques et maladies au Cameroun : Les défis de la biologie dans la lutte antivectorielle. *Harmattan*, ISBN : 978-2-343-24111-1, EAN13 : 9782343241111, EAN PDF : 9782140194924, 222p.

## AWARDS AND FUNDING

- 2022-2023: \$1,800, travel award: CloudForest Workshop (Evolution 2023).
- 2022-2023: \$4000 from The College of Wooster (Ohio, USA) in 2022 to study the density and diversity of mosquitoes in Wooster and predict potential mosquito-borne disease outbreaks.
- 2021-2022 : INFRAVEC 2 : arbovirus screening and gene expression of mosquitoes
- 2014-2015 : Essay on vector control-student membership 2014, PAMCA, Kenya

## CONFERENCES AND ORAL PRESENTATION

- ASV 2024, June 24-28, 2023, Greater Convention Center, Columbus, Ohio USA.  
Genomics and molecular characterization of culicine associated Z virus in wild Aedes japonicus from Northeast, Ohio.
- Evolution 2023, June 21-25, 2023, Albuquerque Convention Center, New Mexico USA.  
Evolutionary function of seminal fluid adipokinetic hormone in Aedes aegypti
- Science Round Table, January 2023, The College of Wooster, Ohio, USA.  
Mosquito viruses : Discovery, transmission and immune responses.
- Arthropod Genomics Symposium 2022, June 9-11, 2022, University of Notre dame, Indiana, USA.  
Gene regulation by mating depends on sugar water and tissue type in female Aedes aegypti
- Seminars and Biology classes. December 2021, Department of Biology, The College of Wooster, Ohio, USA.  
Entomophagy in Cameroon
- American Society for virology (ASV), 38<sup>th</sup> Annual Meeting, July 24-28, 2019, Minnesota, USA 2019.
- Virology journal club seminars. September 2019, Kansas State University, Kansas, USA.  
Anopheles viruses : immune responses and transmission
- American Society of Tropical Medicine & Hygiene (ASTMH) 66th Annual Meeting November 5-9, 2017, Baltimore, USA.  
Poster title: Characterization of novel natural RNA viruses of the African malaria mosquito, Anopheles coluzzii
- EMBO Conference- Vector and disease control, 24 – 28 July 2017 in Chania, Greece.  
Poster title: Interaction of novel natural RNA viruses with Anopheles malaria vectors
- Cameroon Bioscience Society (CBS) 18th December 2011, University of Douala, Cameroon.  
Poster title: Mosquito fauna and malaria transmission in Niete, Cameroon.

## MAJOR MENTORING ACTIVITIES:

Sandra Ateuchthia Ngouanet. 2020-2024: Contribution of wet agriculture in the insecticide resistance status of *Aedes* vectors and arbovirus transmission in Benin, West Africa. PhD thesis. ***In preparation*** at the University of Buea, Cameroon and International Institute of Tropical Agriculture (IITA), Cotonou, Benin.

Haidyn Schuman: 2023-2024. Ecology and Serotypes of *Culex pipiens* complex in Ohio. Biology Department, Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Orion Bress: 2023-2024. Structure and genome of culicine associated Z virus in *Aedes japonicus*. Biology Department, Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Kaydee Clark: 2023-2024. Population structure of *Aedes japonicus* in Medina, Ohio. Biochemistry and Molecular Biology program, Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Otilia Oita: 2023-2024. Polymorphism and transmission *Culex flavivirus* in *Culex* spp from Ohio. . Biochemistry and Molecular Biology program, Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Caileigh Briggs : 2022-2023. Not Such a "Fun-Guy": Infection Patterns of the Fungal Pathogen, *Batrachochytrium dendrobatidis* (Bd), on Northern Two-Lined Salamander Populations at Wooster Memorial Park. Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA. Co-advisor with Dr Lehtinen.

Cristian Amesbury: 2022-2023. Interactions between viruses and *Wolbachia*. Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Tomoka Adams: 2022-2023. Molecular ecology and population genetics of *Aedes japonicus*. Presented in Partial Fulfillment of the Requirements of Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Alex Delong: 2021-2022. The virome of *Aedes japonicus* and *Culex* spp., collected in Wooster, Ohio, USA. Presented in Partial Fulfillment of the Requirements of Senior Independent Study (Bachelor), at The College of Wooster, Ohio, USA.

Rachel Greer: 2020-2021. Communicating science to college students: a comparison of infographic and text based approaches. Presented in Partial Fulfillment of the Requirements of Senior Independent Study (Bachelor). College of Wooster, Ohio, USA. Co-advisor with Dr Sirot.

Dhwani Parsana: 2020-2021. Effect of Adipokinetic Hormone on Mating Receptivity of *Aedes aegypti* Females. Presented in Partial Fulfillment of the Requirements of Senior Independent Study (Bachelor). College of Wooster, Ohio, USA. Co-advisor with Dr Sirot.

Lee, Beenhwa Grace: 2020-2021. The effect of adipokinetic hormone on the blood and sugar feeding behavior and life span of female mosquito *Aedes aegypti*. Presented in Partial Fulfillment of the Requirements of Senior Independent Study (Bachelor). College of Wooster, Ohio, USA. Co-advisor with Dr Sirot.

## MEMBERSHIPS

**2023-Present/** Member of the Society for the Study of Evolution (SSE), USA.

**2021-Present/** Member of the RNA society, USA.

**2019-Present/** Member of the American Society for Virology, USA.

**2017-2023/** Member of the American Society of Tropical Medicine and Hygiene, USA.

**2021-2022/**Member of the Ohio mosquito and vector control association, USA

**2014-2014/**Student member of the Pan Africa Mosquito Control Association (PAMCA), Kenya.

## SERVICE

### Editorial board and review

**2023-Present:** Reviewer for Plos neglected tropical diseases

**2022-Present:** Reviewer for Scientific reports

**2021-Present:** Member of the editorial board at Frontiers in Tropical diseases.

**2021-Present:** Reviewer for Insects

**2021-Present:** Reviewer for International Journal of Environmental Research and Public Health

**2020-2022 :** Guest editors for insects : Special issue “Applied Insect Reproductive Biology”

### Institutional Service at the College of Wooster, Ohio, USA

**2023-Present:** Library Liaison, Department of Biology

**2023-Present:** Co-organizer a Visiting Faculty series on Navigating the Academic Job Markets.

**2022-2023:** Co-coordinator of Life Sciences Seminars, Department of Biology

### Community Service



**2021-Present:** Mosquito surveillance, Wayne County for the Ohio Department of Health, Ohio, USA