Scientific CV Frederik Van den Broeck

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Research focus

Exploring population genomic data to understand the evolution, adaptation and hybridization of eukaryote parasites, providing insights into disease origin and spread, within the context of biomedical relevance and excellence.

Expertise

I have a strong expertise in analysing and biologically interpreting a wide array of genetic data, ranging from microsatellites to whole-genome sequence data. To this end, I'm used to work and write customized scripts in R, the Unix shell and python to do upstream bio-informatic analyses (e.g. *de novo* genome assembly, mapping, variant (SNP/indel/CNV) detection, somy quantification, …) and downstream population genomic and phylogenomic analyses (e.g. SNP and haplotype-based population structure inference, haplotype network analyses, Bayesian phylogenetics, …).

Education and research career

2014-now **Post-doctoral researcher, Institute of Tropical Medicine (ITM), Antwerp, Belgium**
Supervisors: *Prof. Jean-Claude Dujardin & Prof. Jan Van Den Abbeele*
Focus: *Population genomics of* Leishmania *and* Trypanosoma *parasites*
Funding: *Assistant Academic Track Mandate + ITM core funding*

2009-2014 **PhD student, University of Leuven (KUL), Leuven, Belgium**
Supervisors: *Dr. Tine Huyse and Prof. Katja Polman*
Title: *Evolutionary potential of the human parasite* Schistosoma mansoni *in a changing world*
Funding: *VLADOC PhD fellow*

2007-2009 Masters in Evolutionary Biology & Molecular Biology, KUL. *Cum laude*.
2007-2008 Erasmus program. University of Montpellier III, France. *Cum laude*.
2003-2007 Bachelor in Biology, KUL. *Cum laude*.

Additional courses

2015 Workshop Molecular Evolution and Phylogenetics. Czech Republic.
2013 Linux for bioinformatics. VIB Bioinformatics Workshop.
Meeting Skills Training. Arenberg Doctoral School.
2012 Introduction to Perl programming. VIB Bioinformatics Workshop.
2011 Basics of NGS data analysis. VIB Bioinformatics Workshop.
European Summer Institute in Statistical Genetics. University of Washington.
Mixed and Multilevel Models. KUL.
2005 Field diagnostics of human African Trypanosomiasis. ITM.

Mobility: experience in the south

2009-2014 Organized five missions for sampling *Schistosoma* parasites, Senegal.
2010 Boyekoli Ebale Congo Expedition, Democratic Republic of Congo.

Mobility: research visits

Visited 4 laboratories

- 2016 - 2017. Wellcome Trust Sanger Institute, Hinxton, UK (3 times, of which once 1 month)
- 2017. London School of Hygiene and Tropical Medicine, London, UK
- 2013. University of Perpignan, Perpignan, FR
- 2010. Natural History Museum, London, UK

Reviewer and editor for peer reviewed journals or conferences

Handled 87 papers as editor

- Infection, Genetics and Evolution (2014-2016)

Handled 4 papers as reviewer

- Parasite and Vectors (2 papers)
- PLOS Neglected Tropical Diseases (1 paper)
- Evolutionary Applications (1 paper)

Member of the scientific committee of the 13th International Meeting on Molecular Epidemiology and Evolutionary Genetics of Infectious Diseases. 2016

Successful grant writing

Attracted 11 grants

- 2 research grants:
  - 2017. ITM Pump Priming Project on kinetoplast transcriptomics (€ 90,000)
  - 2016. FWO Research Grant on kinetoplast genomics (€ 29,000)
- 2 fellowships:
  - 2015. ITM Assistant Academic Track Mandate. Postdoctoral Fellowship (3 years)
  - 2010. VLADOC PhD Fellowship (3 years)
- 7 travel grants (for research visits, fieldwork and conferences)

Teaching and supervision

Instructor

- Molecular Data in Infectious Diseases Workshop. ITM (2018).
- Ecological and Evolutionary Genomics Course. University of Leuven (2017).
- Molecular epidemiology Course. University of Antwerp (2017).
- Applied Molecular Epidemiology of Infectious Diseases Workshop. ITM (2016).
- Marine Ecological and Environmental Genomics Workshop. Roscoff, France (2015).

Teaching assistant

- Bio-informatics & Quantitative Genetics. University of Leuven (2013-2014).
- Ecology. University of Leuven (2012-2013).

Supervised 1 PhD student, 8 master students and 1 bachelor student

A full list of teaching activities can be found at https://frebio.github.io/Teaching

Presentations

Presented 13 times

- 1 invited seminar at the London School of Hygiene and Tropical Medicine
- 7 oral presentations at the British Society of Parasitology Meeting (BSP), Belgian Society for Parasitology and Protistology (BSPP), Molecular epidemiology, evolution and genetics of infectious diseases (MEEGID), Population Genetics Group Meeting (POPGROUP).
- 5 poster presentations at BSP, Animal Genetics and Diseases (AGD), Infectious Diseases Genomics (IDG), World Congress on Leishmaniasis (WORDLEISH)

A full list of presentations can be found at https://frebio.github.io/Presentations

Publications

Published 16 peer-reviewed (A1) papers, two are currently in review

- 4 papers as first author, incl. a shared first authorship
- 2 papers as last author
- 4 papers as second author
- 4 papers with impact factor > 5, incl. two papers with impact factor > 9

Three main publications (* authors contributing equally)

- Tihon E, Imamura H, Dujardin J-C, Van den Abbele J, **Van den Broeck F** 2017. Discovery and genomic analyses of hybridization between divergent lineages of *Trypanosoma congolense*, causative agent of Animal African Trypanosomiasis. Molecular Ecology. JIF 5.9
- Imamura H*, Downing T*, **Van den Broeck F***, Sanders MJ, Rijal S, Sundar S, Mannaert A, Vanaerschot M, Berg M, De Muylder G, Dumetz F, Cuypers B, Maes I, Domagalska M, Decuypere S, Rai K, Uranw S, Bhattarai NR, Khanal B, Prajapati VK, Sharma S, Stark O, Schönian G7, De Koning HP, Settimo L, Vanhollebeke B, Roy S, Ostyn B, Boelaert M, Maes L, Berriman M, Dujardin JC & Cotton JA. 2016. Evolutionary genomics of epidemic visceral leishmaniasis in the Indian subcontinent. Elife. 5: e12613. JIF 9.3
- **Van den Broeck F**, Maes G, Larmuseau M, Rollinson D, Sy I, Faye D, Volckaert F, Polman K, Huyse T. 2015. Reconstructing colonization dynamics of the human parasite *Schistosoma mansoni* following anthropogenic environmental changes in Northwest Senegal. PLOS Neglected Tropical Diseases 9(8): e0003998. JIF 4.5

A full list of publications can be found at https://frebio.github.io/Pubs