

CURRICULUM VITAE

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*Host – parasite co-evolution in plant pathosystems. Genome architecture and evolution.
Domestication of plants and fungi. Gene flow, hybridization and introgression.*

RESEARCH POSITIONS AND THEMES

2020 – present: post-doctoral researcher in Prof. Dr. Bruce McDonald's team at the **ETH** (*Eidgenössische Technische Hochschule*) of Zurich (Switzerland), in collaboration with Prof. Dr. Daniel Croll at the University of Neuchâtel (Switzerland).

- Adaptation of *Zymoseptoria tritici*, a wheat pathogen, to its host and environment: genome-environment association (GEA) and phenotype-based genome-wide association study (GWAS)
- Worldwide scale population genomics and phylogeography of *Z. tritici*
- Evolution of transposable elements and of the defenses against them in fungi

2017 – 2020: post-doctoral researcher in Prof. Dr. Eva H. Stukenbrock's team at the **MPI** (Max Planck Institute) for Evolutionary Biology in Plön (Germany).

- Pangenomics in several species of plant pathogens: influence of life-history traits and machine-learning predictions
- Comparative genome evolution and epigenomic architecture in the *Zymoseptoria* genus
- Interspecific hybridizations in fungal pathogens
- Population genetic and genomic of *Pyrenophora teres*, a barley pathogen

2014 – 2016: Ph.D. student in Dr. Tatiana Giraud's team at the Ecology Systematic Evolution laboratory in **Paris-Saclay University** (France).

- Crop-to-wild interspecific hybridizations in apple trees and conservation of the wild species of apple trees
- Host-pathogen coevolution in both wild and agricultural environments

EDUCATION

2011-2013: Master's degree in Biology, specialized in Variability, Expression and Evolution of Genomes in Paris-Saclay University (at the time Paris-Sud University) Including a 6-month internship with Dr. Tatiana Giraud and Dr. Amandine Cornille at the Ecology Systematic Evolution laboratory (Ecologie, Systématique, Evolution; France).

2008-2011: Bachelor's degree in Cellular and Molecular Biology and Physiology (first rank during the six semesters) in Angers University.

TECHNICAL AND SOFT SKILLS

- **Genome association methods** with phenotypes (GWAS) or environmental variables (GEA; example software: LEA, GEMMA)
- **Population genomics methods** for population structure and hybridization estimation (ex.: structure, admixture, PCA), demographic estimation (ex.: dadi) or selective sweep detection (ex.: RAISD)
- **Comparative genomics methods:** genome assemblies using short and long-reads (ex.: Spades, canu), *ab initio* or transcript-based gene prediction (ex.: Augustus), functional gene predictions, transposable elements identification (ex.: repeatmodeler, repeatmasker), ortholog identification (ex.: orthofinder, poff), whole genome alignment (ex.: nucmer, minimap2)
- **General genomics methods:** reads alignment (ex.: bwa, bowtie), SNP calling (ex.: GATK), transposable element insertions calling (ex.: ngs-te-mapper2)
- **Transcriptomics and epigenomics methods:** expression detection, differential expression (ex. deSeq2) and Chip-seq peak calling (ex.: macs2)
- **Statistical data analysis and data visualization:** excellent programming and scripting abilities in bash, python and R for data wrangling, statistical analysis, and visualization. Obtained a Data Analytics Specialization certifications from Google.
- **Machine learning predictions** (example methods: random forests, logistic regression, support-vector machine...)
- **Wet lab skills:** DNA extractions, phenotyping of plants and their pathogens
- **Scientific writing:** 16 scientific papers already published as a first author or a co-author
- **Project management:** planning and progress monitoring of research projects for myself and my students
- **Student mentoring:** supervision 10 Bachelor/Master students and co-supervision of a Ph.D. student
- **Teaching:** several courses taught at the ETHZ, and the universities of Neuchâtel and Kiel
- **Languages:** English (fluent), French (native)

TEACHING, SUPERVISING AND PUBLIC OUTREACH

2019-present: Official co-advisor of Silvia Miñana Posada, a PhD student at the ETH Zurich on the “Genetic architecture of adaptation in the plant pathogen *Zymoseptoria tritici*”

2022: Supervision of Manuel Cavigelli (Bachelor's project, 6 months part-time), Daniel Osoko (Master's project, 3 months) and Yvo Schulteis (Master's thesis, 6 months, co-supervision with Cécile Lorrain)

Spring semester 2022: Teaching assistant in an Apprentissage Par Problème (APP) course in Evolutive Biology at Neuchâtel University

Fall semester 2021: Teaching assistant in a Block Course at the ETH Zurich on the adaptation of plant pathogen to temperature stresses

Fall semester 2020 and 2021: Teaching assistant in a Scientific Writing Course at the ETH Zurich

2018-2019: Supervision of Demetris Taliadoros, Master's student (6 months, Master's thesis and 4 months, Master's internship)

Fall semester 2018 & 2019: Teaching assistant in the Population Genomics course in Kiel University

2017- 2018: Supervision of 3 Ph.D rotation projects (6 weeks) of Khawla Abualia, of Lizel Potgieter, and of Julian Koch. **Supervision** of Danielle Stevens (2 months; Bachelor's internship).

2012-2015: Supervision of Douae Ben Hdech, Master's student (4 months; Master's internship) and of William Fontanaud, Master's student (6 months; Master's thesis)

2014-2015: Demonstrator in a museum in Paris (Palais de la Découverte, France) dedicated to present science to adults and children alike.

2016: Writing and publication of an article about domestication and its impact on human civilization ("Domestication, une révolution à l'origine de la civilisation") in a French **science popularization magazine** entitled « Découverte ».

2015: Collaboration with Christian Tailliez, a high school teacher, on a project for his students.

2011: Mentoring in microbiology, genetic and chemistry to students in their first year of Bachelor's degree.

GRANTS

2018: SPP1819 start-up grant from the DFG (**Deutsche Forschungsgemeinschaft**), intended for young researchers to set up their first independent research project.

INVITED TALKS TO INTERNATIONAL CONFERENCES

2022: International Symposium on Cereal Leaf Blights Invited keynote talk

2018: International Mycological Congress (IMC11) Invited talk in the Evolutionary genomics symposium

ACADEMIC PUBLICATIONS IN PREPARATION AND SUBMITTED

- Feurtey A, [...], McDonald B, Croll D. A thousand-genome panel retraces the global spread and adaptation of a major crop pathogen. In prep. Planned for publication in 2022.

ACADEMIC PUBLICATIONS ACCEPTED IN PEER-REVIEWED INTERNATIONAL JOURNALS

- Hassani MA, Oppong-Danquah E, **Feurtey A**, Tasdemir D, Stukenbrock EH. Differential regulation and production of secondary metabolites among isolates of the fungal wheat pathogen *Zymoseptoria tritici*. Environmental Microbiology 88 (6). (2022)

- Habig M, Lorrain C, **Feurtey A**, Komlusi J, Stukenbrock EH. Epigenetic modifications affect the rate of spontaneous mutations in a pathogenic fungus. *Nature communications* 12 (1), 1-13 (2021)
- Vasighzadeh A, Sharifnab B, Javan-Nikkhah M, Seifollahi E, Landermann-Habetha D, **Feurtey A**, Stukenbrock EH. Population genetic structure of four regional populations of the barley pathogen *Pyrenophora teres* f. *maculata* in Iran is characterized by high genetic diversity and sexual recombination. *Plant Pathology* 70 (3), 735-744. (2021)
- Lorrain C, **Feurtey A**, Möller M, Haueisen J, Stukenbrock EH. Dynamics of transposable elements in recently diverged fungal pathogens: lineage-specific transposable element content and efficiency of genome defenses. *G3* 11 (4). (2021)
- Möller M, Habig M, Lorrain C, **Feurtey A**, Haueisen J, Fagundes WC, Alizadeh A, Freitag M, Stukenbrock EH. Recent loss of the Dim2 DNA methyltransferase decreases mutation rate in repeats and changes evolutionary trajectory in a fungal pathogen. *PLoS genetics* 17 (3) . (2021)
- Stauber L, Badet T, **Feurtey A**, Prospero S, Croll D. Emergence and diversification of a highly invasive chestnut pathogen lineage across southeastern Europe. *Elife* 10. (2021)
- **Feurtey A***, Guitton E*, De Gracia Coquerel M, Duvaux L, Shiller J, Bellanger MN, Expert P, Sannier M, Caffier V, Giraud T, Le Cam B and Lemaire C. Asian wild apples threatened by gene flow from domesticated apples and by pestified pathogen invasions. *Molecular Ecology* 29 (24), 4925-4941. (2020) [*Contributed equally]
- **Feurtey A***, Lorrain C, Croll D, Eschenbrenner C, Freitag M, Habig M, Haueisen J, Möller M, Schotanus K, Stukenbrock EH. Ancestral genome compartmentalization predates species divergence in the *Zymoseptoria* genus. *BMC genomics* 21 (1), 1-15. (2020)
- Potgieter L, **Feurtey A**, Dutheil JY, Stukenbrock EH. On variant discovery in genomes of plant pathogens. *Frontiers in Microbiology* 11, 626. (2020)
- Eschenbrenner C, **Feurtey A**, Stukenbrock EH. Population Genomics of Fungal Plant Pathogens and the Analyses of Rapidly Evolving Genome Compartments. Chapter 14 of *Statistical Population Genomics. Series: Methods Molecular Biology*. (2020)
- Dumas E, **Feurtey A**, Rodríguez de la Vega RC, Le Prieur S, Snirc A, Coton M, Thierry A, Coton E, Le Piver M, Roueyre D, Ropars J, Branca A, Giraud T. Independent domestication events in the blue-cheese fungus *Penicillium roqueforti*. *Molecular Ecology* 29 (14), 2639-2660. (2020)
- **Feurtey A**, Stevens DM, Stephan W, Stukenbrock EH. Interspecific gene exchange introduces high genetic variability in crop pathogen. *Genome Biology and Evolution* 11 (11), 3095-3105. (2019)
- **Feurtey A.** and Stukenbrock EH. Interspecific Gene Exchange as a Driver of Adaptive Evolution in Fungi. *Annual Review of Microbiology* 72, 377-398 (2018)
- **Feurtey A.**, Cornille A., Shykoff J., Snirc, A., Giraud T. Crop-to-wild gene flow and its fitness consequences for a wild fruit tree: towards a comprehensive conservation strategy of the wild apple in Europe. *Evolutionary Applications* 10 (2), 180-188. (2017)
- **Feurtey A.**, Gladieux P., Snirc A., Hood M, Cornille A., Giraud T. Strong phylogeographic costructure between the anther smut fungus and its white campion host. *New Phytologist* 212 (3), 668-679. (2016)
- Gladieux P., **Feurtey A.**, Hood M.E., Snirc A., Dutech C., Roy M., Clavel J., Giraud T. Biological invasions: lessons from fungi and the case of the anther smut. *Molecular ecology* 24 (9), 1969-1986. (2015)

- Cornille A., **Feurtey A.**, Gélín U., Misvanderbrugge K., Gladieux P., Ropars J., Giraud T. Anthropogenic and natural drivers of gene flow in a temperate wild fruit tree. *Evolutionary Applications* 8 (4), 373-384. (2015)