

Dr. François Jean André GAASCHT, PhD

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SUMMARY

- Natural product scientist with 10+ years of experience.
- Professional skills in microbiology, natural product chemistry, molecular biology and synthetic biology.
- Enthusiastic self-learner enjoying working in a highly dynamic multi-disciplinary team environment.

EDUCATION

PhD's Degree in Life and Health Sciences - "Doctor Europaeus" label,

University of Lorraine (Metz, France), December 2013

Master's Degree (MSc) in Molecular and Structural Biology

University of Strasbourg (Strasbourg, France), June 2009

Bachelor's Degree (BSc) in Biochemistry and Molecular Biology

Louis Pasteur University (Strasbourg, France), June 2007

WORK EXPERIENCE

Research Associate – Lab Manager, June 2022 – Present

University of Minnesota, BioTechnology Institute, Saint Paul, Minnesota, USA

Extremophile Strain Engineering

Development of genetic tools for extremophile chassis engineering for living functional composite biomaterial fabrication (research project supported by the Army Center for Synthetic Biology, Department of Defense).

Creation, development, and optimization of genetic tools for engineering extremophile organism *Deinococcus* sp. for design and assembly of functional engineered living biomaterials capable of self-fabrication for application as field deployable UV- and desiccation-resilient materials such as sentinels, biosensors, bioremediation catalysts, functional coatings (biocidal, anti-corrosive), additive materials, for incorporation into wearable devices or on-demand, on-site chemical manufacturing that are of interest to the army.

Fungi Strain Engineering

Creation of unique fungal strains for rapid cloning and easy-expression of cryptic Basidiomycota gene clusters and genes of industrial interests (therapeutic agents, antibiotics, eco-friendly laundry detergents, biocatalysts and enzymes,...) using modern genetic engineering techniques (CreLox, CRISPR/Cas9-12, CRISPRa) (research project supported by the University of Minnesota – BioTechnology Institute).

Targeted isolation of cryptic gene clusters from genomic DNA of unsequenced field-collected Basidiomycota strains and one-step cloning into a fungal workhorse for heterologous expression.

Development of automatic screening tools for detection of functional biosynthetic gene clusters and fungal biocatalysts by synthetic biology approach.

Creation and development of Python scripts to automate recurrent and time-consuming tasks, manage and analyze large data sets such as DNA sequences (fasta files, gene clusters,...) and results.

Lab Manager

Support of the Principal Investigator (Director of BioTechnology Institute) in the organization and maintenance of our laboratory (5 members). Day-to-day activities include administrative tasks, budget tracking, supplies inventory, equipment maintenance, lab ordering, keeping laboratory safe, organized and a peaceful, positive, and cutting-edge scientific work environment.

Postdoctoral Research Associate, October 2016 – August 2021

University of Minnesota, BioTechnology Institute, Saint Paul, Minnesota, USA

Systematic building and exploitation of a Midwestern Basidiomycota library for enzyme and drug discovery.

Building and curation of a library (> 50 strains) of field collected Basidiomycota strains (field trips, preparation of microbial cultures, identification by DNA barcoding, preservation). Preparation of microbial fermentations in different formats and conditions, elicitation of secondary metabolites (OSMAC strategy). Development of a fast and low-cost workflow for screening of fermentations for enzymatic activities in multi-well plates format. Preparation of extracts for metabolomics profiling and drug discovery screening.

Isolation of genes of biotechnological interests (unspecific peroxygenases, cellobiose dehydrogenase, terpene synthases) by genome mining and bioinformatic approach (RNA isolation/cDNA synthesis from fungal cultures) from my Field-to-Lab Basidiomycota strain collection, cloning (Gibson method) and heterologous expression in fungal (*Pichia pastoris*) or bacterial (*Escherichia coli*, *Bacillus subtilis*) host systems for characterization.

Chemist in Natural Product Chemistry, November 2014 – January 2015

Individual Leonardo da Vinci grant, Lifelong Learning Programme, European Commission
Fundación MEDINA, Centro de Excelencia en Investigación de Medicamentos Innovadores en Andalucía, Granada, Spain

Apprenticeship within the objectives to acquire solid good basis and new skills in bioactive natural products isolation and identification from microorganisms. Preparation of extracts from microbial cultures (bacteria and fungi), fractionation of extracts and isolation of natural products by liquid chromatography techniques (CombiFlash, (semi-) preparative HPLC). Structure elucidation of small molecules and natural products from (high-resolution) – MS, 1D and 2D NMR data (H, C, HSQC, HMBC, COSY).

PhD Thesis, September 2009 – December 2013

Grant Marie Curie Action, RedCat Training Network, Initial Training Network (ITN) (Project 215009), European Commission – 7th Framework Programme
Laboratoire de Biologie Moléculaire et Cellulaire du Cancer, Luxembourg, Luxembourg

Analysis of anticancer cytotoxic potential and study of anticancer activities (cytotoxicity, anti-proliferative, NF- κ B pathway inhibition, identification of cell death mechanism, proteasome inhibition, pro-oxidant action,...) and elucidation of cellular mechanisms of action of extracts (*Dionaea muscipula*), natural (flavonoids, fungal compounds) and hemi-synthetic molecules flavonoids, coumarin, curcumin derivatives,...) for discovery, identification and characterization of molecules from natural origins capable of targeting transduction, proliferation, inflammation and cell death pathways in various human cancer cell models.