

Annie FRELET-BARRAND Researcher CNRS (CRHC, HDR)
FEMTO-ST Institute, CNRS, Université Bourgogne Franche-Comté
15B Avenue des Montboucons, 25030 Besançon cedex, France
annie.frelet-barrand@femto-st.fr

EDUCATION

2006 PH. D. IN PLANT MOLECULAR PHYSIOLOGY (DOCTOR IN LIFE SCIENCES), Universities of Neuchâtel
and then Zurich

1999 MASTER OF BIOCHEMISTRY, MOLECULAR AND CELLULAR BIOLOGY, Université de Franche-Comté,
Besançon, France

WORK EXPERIENCE

2023-NOW *Researcher CNRS (CRHC, HDR)*, Institute FEMTO-ST UMR6174, BIND Team, Besançon, France

Engineering & qualifications of native and synthetic biological elements

2015-2023 *Researcher CNRS (CRCN)*, Institute FEMTO-ST UMR6174, BMD Team, Besançon, France

Engineering & qualifications of native and synthetic biological elements

2009-2015 *Researcher CNRS (CR2 THEN CR1)*, I2BC CNRS UMR9198 / CEA Saclay, iBiTec-S, LSOD Team, Saclay, France

Highlighting a functional coupling between cytochromes P450-glutathione S-transferases and multidrug transporters in detoxification.

2006-2009 *Post-Doctoral Fellowship*, Laboratory of Plant Cellular Physiology, CEA Grenoble, France

Expression of membrane proteins in *Arabidopsis thaliana* and *Lactococcus lactis* (CEA-PM) and structure/function study of membrane transport systems associated with the chloroplast envelope

2001-2006 *PhD in Natural sciences*. Laboratory of Plant Molecular Physiology, University of Neuchâtel then University of Zürich.

Functional characterizations of transporters of drug resistance of *A. thaliana*, MRP2 & MRP5.

RESEARCH

PROJECTS

Since 2001, I have been producing and characterizing membrane proteins (MPs) & vesicles, bacteria, mammalian cells & whole plants. From 2006 to 2009, I set up and developed the *Lactococcus lactis* bacterial expression system, successfully expressed 2/3 of the project's MPs and carried out structure-function studies of plant MPs. I am currently one of the only researchers world-wide with expertise in expression and functional characterization of MPs in *L. lactis*. From 2009 to 2015, I successfully expressed 2 out of 3 human MPs involved in detoxification (cytochromes P450 and glutathione-S-transferase) in *L. lactis*.

From 2015 (transfer to the FEMTO-ST Institute) to January 2023, I worked in the BioMicroDevices team (Resp. T. Leblois) in the MN2S department (Dir. V. Laude) which worked on detection, characterization and quantification of biological elements in fluids for a better understanding of biological or agri-food mechanisms. Since February 2023, I have been part of the BIND team (Resp. V. Humblot) which develops microdevices for detection, sorting, qualification and quantification of biological elements in complex environments using two parallel and complementary approaches: i) bottom-up approach development, from an existing biointerface, of a high-performance microdevice and ii) top-down approach. My projects consist here in developing new tools for production and multi-scale biological, biochemical and biophysical characterizations of biological elements of eukaryotic and prokaryotic origins (PMs, synthetic and native vesicles, bacteria and mammalian cells). It integrates my expertise in biotechnologies, biochemistry, microbiology and cell biology and allows to contribute to development of new instrumentations and methods for functional studies. These experiments are carried out in solution and on surface, in our team and/or in collaboration, to better know/understand these biological elements and to set up bio-interfaces and detection/characterization devices for these elements in more or less complex environments for applications in health and agri-food. I am also involved in collaborations with other teams/laboratories concerning the expression of proteins and PMs in *L. lactis* and for the generation of other recombinant bacteria expressing soluble proteins or PMs.

Keywords: DNA, protein, bioengineering, bioproduction, biochemistry, biophysics, *Lactococcus lactis*

Projects & grants / funding:

- **Coordinator of the Prematuration CNRS project** (2024-2025; 185 k€, 18 months)
- **Scientific, administrative & financial coordinator** of the European project **MiMédi** for the MN2S department (2017-2022 ; 1M€)
- **Coordinator** for the FEMTO-ST institute **of the ANR Cavéotank** (2017-2021; 86 k€)
- **Coordinator of the BFC regional funding for Excellence/Emergence Nano-Lacto** (2016-2018 ; 145 k€)
- **Recipient of the funding DIM Sent Ile de France** (PhD funding, 90 k€)

Scientific productions: 30 articles, 13377 citations, H index = 17; 50 scientific communications including 7 as invited speaker

Reviewer for: Microbial Cell Factories, BMC Biotechnology, AMAB, Pathogens, Antibiotics, Biomolecules, Biotech Adv, BMC Biotech, IJMS, Microbiome research, Microorg research, Membranes, Marine drugs, JExB, JEV, Diagnostics, Molecules, Prot Exp & Purif, Processes.

Member of: Health commission (Biotech/Medtech) of PMT, Besançon (25) since 2015; commission CSST of Institute FEMTO-ST since 2017; Part of steering Committee: GDR B21 (Besançon, June 2018) ; FSEV conference (Strasbourg, November 2024)

MANAGEMENT : 2 PhD students, trainees : 11 Master 2, 6 Master 1, 2 L3, 16 BTS, 7 engineers ISIFC (2nd & 3rd year); 13 engineers CDD (4 IR, 6 IE, 3 AI)

LECTURER : 2 courses to M2 RHG/I3C & ISIFC 3rd year students option Bioengineering – Production of recombinant proteins in diverse expression systems