

DIMITRI FAYOLLE

Research engineer – magnetic resonance for life sciences

PhIND (U1237 INSERM) and CERMN (EA4258 CNRS)

GIP Cyceron

Boulevard Henri Becquerel

BP 5229

14074 CAEN Cedex 5

Dimitri.fayolle@unicaen.fr



CURRENT POSITION

Research Engineer – NMR and MRI, University of Caen Normandie
NanoXe: hyperpolarized ^{129}Xe MRI for the diagnosis of neuroinflammation

Since Jan. 2022

RESEARCH THEMES

- Magnetic resonance (NMR, MRI) of hyperpolarized ^{129}Xe for in vivo imaging applications
- Peptide-nucleotide conjugates, amphiphilic biomolecules
- Biomolecule – biomimetic membrane interactions, supramolecular edifices
- Systems chemistry, origins of life, prebiotic chemistry of translation and lipids

TECHNICAL EXPERTISE

- Liquid-state NMR: structure elucidation, analysis of complex mixtures (2D, selective excitation, DOSY...), interaction measurement (diffusion, exchange spectroscopy), quantification...
- HPLC and LC/MS: biomolecules, complex mixtures, very polar species, preparative HPLC
- Liposomes: preparation, encapsulation, microscope imaging
- Organic synthesis: biomolecules, fluorescent probes, amphiphiles

FORMER POSITIONS AND ACTIVITIES

PhD thesis , University of Lyon “Concomitant synthesis of peptides and oligonucleotides in the presence of lipids and lipid vesicles”. Supervisor Prof. Peter Strazewski, funding Volkswagen Stiftung	2017-2020
Scientific mission , German grant (DAAD), University of Stuttgart Formation of amphiphilic bioconjugates in condensation buffers	Aug. 2019
Master 2 internship , University of Lyon Synthesis of clickable fluorescent probes for confocal microscope imaging. Supervisor Dr Michele Fiore	Feb. – Jul. 2017
Scientific mission , European COST network, Rome 3 University Rapid purification of giant vesicles by microfiltration	Aug. 2016
Master 1 internship , University of Lyon Photochemical synthesis of glycolipids. Supervisor Dr Michele Fiore	Apr. – Jul. 2016

PEER-REVIEWED PUBLICATIONS

6. M. Fiore, **D. Fayolle**, J. Ruiz, C. Chieffo, A. Lopez, L. Soulère, P. Oger, E. Altamura, F. Popowycz and R. Buchet, Prebiotic synthesis of phospholipids and analogies with phospholipid biochemistry. *Astrobiology*. **2022**, 22, 6. www.doi.org/10.1089/ast.2021.0059
5. A. Lopez, **D. Fayolle**, M. Fiore and P. Strazewski, Chemical analysis of lipid boundaries after consecutive self-reproductions of supported giant vesicles. *iScience*. **2020**, 23 (11), 101677. www.doi.org/10.1016/j.isci.2020.101677
4. E. Altamura, A. Comte, A. D'Onofrio, C. Roussillon, **D. Fayolle**, R. Buchet, F. Mavelli, P. Stano, M. Fiore and P. Strazewski, Racemic phospholipids for origin of life studies. *Symmetry*. **2020**, 12 (7), 1108. www.doi.org/10.3390/sym12071108
3. **D. Fayolle**, N. Berthet, B. Doumeche, O. Renaudet, P. Strazewski and M. Fiore, Towards the synthesis of outer membrane vesicle models with micromolar affinity to wheat germ agglutinin from alkyl dithioglycosides. *Beilstein J. Org. Chem.* **2019**, 15, 937-946. www.doi.org/10.3762/bjoc.15.90
2. **D. Fayolle**, M. Fiore, P. Stano and P. Strazewski, Rapid purification of giant lipid vesicles by microfiltration. *PLoS ONE* **2018**, 13: e0192975 www.doi.org/10.1371/journal.pone.0192975
1. **D. Fayolle**, E. Altamura, A. D'Onofrio, W. J. Madanamothoo, B. Fenet, F. Mavelli, R. Buchet, P. Stano, M. Fiore and P. Strazewski, Crude phosphorylation mixtures containing racemic lipid amphiphiles self-assemble to give stable primitive compartments. *Sci. Rep.* **2017**, 7, 18106. www.doi.org/10.1038/s41598-017-18053-y

ORAL COMMUNICATIONS AND POSTERS

6. **D. Fayolle**, M. Fiore and P. Strazewski, Co-evolution of peptides, RNA and lipids. **Poster**, *Volkswagen Stiftung Status Symposium on "Life?"*, **2019**, Hanovre, Allemagne
5. **D. Fayolle**, M. Fiore and P. Strazewski, The formation of peptido-RNA in the presence of giant vesicles. **Oral communication**, *séminaire annuel de l'ICBMS*, **2019**, Villeurbanne, France. **Best oral communication prize**
4. **D. Fayolle**, M. Fiore and P. Strazewski, Abiotic, enzyme-free formation of peptide-RNA conjugates in water in the presence of lipid aggregates. **Oral communication**, *Congress of the French Chemical Society*, **2018**, Montpellier, France
3. **D. Fayolle**, M. Fiore, P. Stano and P. Strazewski, Rapid purification of giant lipid vesicles by microfiltration. **Poster**, *symposium "Systems Chemistry 2017" de l'action COST CM 1034*, **2017**, Sopron, Hongrie
2. **D. Fayolle**, P. Stano, M. Fiore and P. Strazewski, Purification of giant lipid vesicles by microfiltration. **Oral communication**, *Groupe de travail 3 de l'action COST CM 1034*, **2017**, Varsovie, Pologne
1. **D. Fayolle**, M. Fiore, A. Dhenain, E. Lacôte, P. Larini and P. Strazewski, "Tetrazine-Click-ARN". **Poster**, *restitution à l'Institut de Chimie de Lyon*, **2017**, Villeurbanne, France

TEACHING AND TRAINING

Supervisor (full or co-supervisor) of more than 10 internships since 2017, including 3 future PhD students.

High-school teacher of physics and chemistry (2021). Examiner and corrector for national exams.

NON-ACADEMIC TALKS AND OTHER INVOLVEMENTS

« Conférences embarquées 2021 » : General public outdoor conference cycles (CNRS of Lyon) **Aug. 2021**

Local finalist of “Ma these en 180 secondes” (3-minute thesis), Lyon **2021**

Project Dataacc : electronic lab books and 2.0 data management **Since 2019**