

Yann GAMBIN

Born : July, 20th 1980, Nationality : French, personal situation : single.

Education :

2005-2002 :

Ph.D. Thesis at Ecole Normale Supérieure, (Ulm, ParisVI), Advisor : Pr. Wladimir URBACH
Title : transmembrane peptides and proteins, diverse studies in model membranes.

2002 :

Master degree (University Pierre et Marie Curie, Paris VI), Mention : BIEN
Magistere Interuniversitaire de Physique, Ecole Normale Supérieure (Ulm): Mention : BIEN

2001-2000

Training period with Pr. Stephen Quake at Caltech, CA; consulting experience at Fluidigm.
Bachelor degree (Magistere Interuniversitaire de Physique, Ecole Normale Supérieure, Paris VI)

Summary of the competences acquired:

- PEPTIDES : Synthesis and purification of hydrophobic, transmembrane peptides (diblocs and triblocs.) (Training in collaboration with R.S. Hodges, Canada.)
- PROTEINS : Labeling and reconstitution of membrane proteins into Giant Unilamellar Vesicles (GUVs). (Electroformation techniques). Micromanipulation and Langmuir-Blodgett techniques.
- FRAPP : Measure of lateral mobility of peptides and proteins embedded in various bilayers (lipids or model bilayers of tunable thickness.) Characterization of diffusive processes.
- SINGLE MOLECULE : Single-molecule pulling experiments: during my Ph.D, I measured the strength of anchorage of various transmembrane peptides incorporated in GUVs.
- IR SPECTROSCOPY was performed on oriented bilayers (in collaboration with F. Homble, Belgium) to characterize tilt angles of peptides under hydrophobic mismatch.
- MODEL MEMBRANE : Use of lipids or surfactants to create various phase of bilayers (cubic, sponge or lamellar phase), characterized by SAXS and DLS/DQLS experiments. The transmembrane proteins are easily incorporated in these model systems and protein-protein interactions can be precisely studied. These phases of multi-connected bilayers are tested for membrane protein CRYSTALLOGRAPHY too.
- MICROFLUIDICS : Design and manufacture of microfluidic networks using multilayer soft lithography; valves, pumps and micro-optics can be integrated on the micro-chips.
- OPTICS : Conception and realization of optical setups (pattern photobleaching using 4 laser beams to measure the mobility of particles in evanescent waves); manufacture of mechanical components. I particularly worked on new techniques of molding, using surface tension, to produce micro-optics that can be assembled into a microscope.

Patents :

(click on the links for details)

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| 1° <u>Microfabricated rubber microscope using soft solid immersion lenses</u> | US2005052754 - 2005-03-10 |
| 2° <u>Microfabricated lenses, method of manufacture thereof, and applications therefor</u> | US2004196569 - 2004-10-07 |
| 3° <u>Nonimaging concentrator lens arrays and microfabrication of the same</u> | US2003095340 - 2003-05-22 |
| 4° <u>Microfabricated lenses, methods of manufacture thereof, and applications therefor</u> | US2003123155 - 2003-07-03 |
| 5° <u>MICROFABRICATED LENSES, METHODS OF MANUFACTURE THEREOF, AND APPLICATIONS THEREFOR</u> | WO03031163 |

Publications**Self-diffusion and collective diffusion in a model viscoelastic system**

E. Michel, L. Cipelletti, E. d'Humieres, Y. Gambin, W. Urbach, G. Porte, and J. Appell
PHYSICAL REVIEW E **66**, 031402 (2002).

Bounded Step Superdiffusion in an Oriented Hexagonal Phase

Yann Gambin, Gladys Massiera, Laurence Ramos, Christian Ligoure, Wladimir Urbach.
PHYSICAL REVIEW LETTERS **94**, 110602 (2005)

A Microfabricated Rubber Microscope Using Soft Solid Immersion Lenses

Yann Gambin, Olivier Legrand, Stephen Quake
To be submitted to Applied Physics Letters

Lateral mobility in membranes: are experimental results correctly described by Saffman model

Yann Gambin, R. Lopez-Esparza, M. Reffay,, Wladimir Urbach, to be submitted

Strenght of anchorage of transmembrane peptides : the longer the stronger ?

Yann Gambin, Emma Sierecki, Frederic Pincet, Robert Hodges, Wladimir Urbach
To be submitted

Consequences of hydrophobic mismatch : lateral mobility, strength of anchorage, and auto-association of transmembrane peptides ; application to protein crystallography.

Yann Gambin, Emma Sierecki,....., Wladimir Urbach In preparation

References :

Thesis Advisor: Pr. Wladimir URBACH, urbach@lps.ens.fr

An active collaboration during my Ph.D: Pr. Arnaud DUCRUIX, ducruix@univ-paris5.fr

Lab experience abroad :

- Training supervisor for 8 months, Caltech: Pr. Stephen R. QUAKE, quake@stanford.edu
- Microfluidics collaboration (MIT): Pr. Todd THORSEN, thorsen@mit.edu
- consulting at Fluidigm, (San Francisco): Emerson QUAN, emerson.quan@fluidigm.com
- Peptide synthesis (Canada): Pr. Robert HODGES, Robert.Hodges@UCHSC.edu
- Photobleaching setup (Mexico): Pr. A. MALDONADO, maldona@nirvana.fisica.uson.mx

Past and present researches :

You will find on my website (www.yann.gambin.com) the details of my present and past studies, along with links and downloadable documents. Here is a list of my lab experiences, in France or abroad.

2002-2005 : Ph.D. Thesis under the supervision of Pr. W. URBACH
Laboratory of « organized molecular structures », LPS of Ecole Normale Supérieure (UMR 8550)

*Transmembrane peptides and proteins : lateral mobility, anchorage, ...
Diverse studies in model membranes.*

July- August 2004 : collaboration with Pr. A. MALDONADO, University of Sonora, Mexico

Design of a simplified photobleaching setup using fringe pattern.

July- August 2003 : Peptide synthesis at P.E.N.C.E laboratory, University of Alberta, Canada
Collaboration with Marc GENEST, Pr. Robert HODGES.

*Synthesis of various transmembrane peptides using solid phase chemistry;
Techniques of purification of these hydrophobic compounds by reverse phase HPLC.*

2002-2001 : 1 year - master's degree training : under the supervision of Pr. W. URBACH
Laboratory of « organized molecular structures », LPS of Ecole Normale Supérieure,
in collaboration with C. LIGOURE, GDPC, Montpellier, Fr.

*Levy flights with bounded step length in an oriented hexagonal phase;
Conception and realization of a new photobleaching setup using evanescent waves.*

August 2001 : consulting experience at Fluidigm (biotech company : microfluidics and protein crystallisation, www.fluidigm.com) San Francisco, CA, USA.

Transfer of technology from the lab of Stephen QUAKE : manufacture of new high-performance optical elements integrated to microchips. Patenting of techniques and optical designs.

2001 : Training program of 8 months : in Stephen QUAKE's lab, California Institute of Technology, Pasadena, CA, USA.

A rubber micro-microscope integrated to microfluidic chips. Development of new techniques of micro-molding using surface tension and assembly of multi-components optics.

Summer 2000 : 1 month - training under the supervision of Pr. C. SYKES and Pr. J. PROST, Institut Curie, Paris.

Artificial Listeria : a coated bead is set in motion by an actin comet.

2000 : 2 months of training under the supervision of Pr. W. URBACH, Ecole Normale Supérieure,

Self-diffusion and collective diffusion in a model viscoelastic system

2000 : Half-time training - 2 months under the supervision of Pr. S. DOUADY, LPS of ENS

Critical angle of equilibrium in a granular material; analysis at the individual scale.