

## Karla PEREZ TORALLA

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Post-doctoral researcher.

**Email address:** perez.toralla<at>gmail.com

### PhD thesis

**Laboratory:** MMBM group, Institut Curie, Paris, FRANCE

**Title:** « Microfluidic system for in situ molecular characterization of cancer cells »

**Supervisors:** Jean Louis VIOVY, Laurent MALAQUIN, Stephanie DESCROIX

**Accomplishments:** Developed a complete toolbox for the microfabrication of COC

Chose, optimized and validated relevant biological tools for the analysis of cancer cells, in collaboration with clinicians

Developed an integrated COC platform for the implementation of cellular and molecular biology protocols

**Management:** Managed a work package in the EU FP7 projects CAMINEMS (N°228980) and DIATOOLS (N°259796): two technological research projects aiming at developing new diagnosis tools for cancer screening Collaborated in the EU FP7 projects NADINE (N°288956)

Mentored Ezgi TULUCKUOGLU, during her 6-month master internship

**Dissemination:** Trained several users to COC microfabrication and adapted the fabrication protocols and chip design to their needs. Trained several users to the microfluidic platform for cell analysis

### Scientific skills

**Micro and nano fabrication:** Photolithography, wet and dry etching (glass, silicon), nanoimprint lithography, clean room environment (ISO 5), soft lithography (PDMS), hot and roll embossing (COC thermoplastic), thin film deposition (spin coating, evaporation, sputtering), self assembly of magnetic microspheres

**Microfluidics:** Design and characterization of microfluidic architectures (2D and 3D), hydrodynamic modeling, surface treatment of microchannels (antifouling/cell adhesion), flow control automation, thermal control for biological protocols

**Cell biology:** Cell culture in L2 biosafety facility (epithelial: MCF7, SKBR3, A549, G401 - hematopoietic: Raji, Jurkat), slide and sample preparation, DNA and protein analysis (IF, FISH, RT-RCA and PLA) on glass slides and on chip

**Characterization:** Ellipsometry, scatterometry, profilometer, contact angle goniometer and tensiometer, XPS, FTIR, DSC, DMA

**Microscopy:** Bright field, epi-fluorescence, deconvolution, confocal, SEM, TEM, AFM, STM, microscope automation and image analysis

## Work Experiences

**Feb.-August 2009:** SVI- UMR CNRS/Saint Gobain Recherche, Aubervilliers, FRANCE

Internship title: « Nanoimprint of porous sol-gel coating for microfluidic devices »

Supervisors: Etienne BARTHEL, Jérémie TEISSEIRE

**April-August 2008 :** LTM, c/o CEA-LETI, Grenoble, FRANCE

Internship: « Low viscosity monomers for thermal nanoimprint »

Supervisors: Jumana BOUSSEY-SAID, Cécile GOURGON, Marc ZELSMANN

## Education

**2009-2012:** PhD. in Physics specialized on Microfluidics and cancer cells

University Diderot, Paris-7, FRANCE

Institut Curie, UMR168, FRANCE

Doctoral School "Frontiers in life science", FRANCE

**2007-2009:** M.Sc. (with honors) in Physics specialized on Nanotechnology

University of Orsay, Paris-Sud 11, FRANCE

**2004-2007:** B.Sc. (with honors) in Physics specialized on semiconducting materials

University of Montpellier 2, FRANCE

## Other skills

**IT:** Programming and modelling (C/C++, Java, html, Matlab, Labview)

Multiphysics simulations: Comsol

DTP and Design (Adobe Photoshop, Adobe Illustrator, AutoCad)

Microsoft Office, Open Office, Windows, Linux

**Languages:** Bilingual Spanish/French/ Fluent English/ Basic German

## Publications and communications

*Papers in peer-reviewed journals:*

**Multiplex Detection of Rare Mutations by Picoliter Droplet Based Digital PCR: Sensitivity and Specificity**

**Considerations.** Zonta, F. Garlan, N. Pecuchet, K. Perez-Toralla, O. Caen, C. Milbury, A. Didelot, E. Fabre, H. Blons, Pierre Laurent-Puig, Valérie Taly, , **PloS one**, 11(7), 2016

**A Study of Hypermethylated Circulating Tumor DNA as a Universal Colorectal Cancer Biomarker.** Garrigou, G. Perkins, F. Garlan, C. Normand, A. Didelot, D. Le Corre, S. Peyvandi, C. Mulot, R. Niarra, P. Aucouturier, G. Chatellier, P. Nizard, K. Perez-Toralla, E. Zonta, C. Charpy, A. Pujals, C. Barrau, O. Bouche, J-F. Emile, D. Pezet, F. Bibeau, JB. Hutchinson, D. Link, A. Zaanen, P. Laurent-Puig, I. Sobhani, V. Taly, **Clinical Chemistry**, 2016

**Digital PCR compartmentalization I. Single-molecule detection of rare mutations.** Perez-Toralla, D. Pekin, JF. Bartolo,

F. Garlan, P. Nizard, P. Laurent-Puig, J.C. Baret, V. Taly, **Médecine/Sciences**, 31(1), 2015.

**Digital PCR compartmentalization II. Contribution for the quantitative detection of circulating tumor DNA**, Caen, P.

Nizard, S. Garrigou, K. Perez-Toralla, E. Zonta, P. Laurent-Puig, V. Taly, **Médecine/Sciences**, 31(2), 2015.

**FISH in Chips: Turning microfluidic Fluorescent In Situ Hybridization into a quantitative and clinically reliable molecular diagnosis tool**. Perez-Toralla, G. Mottet, E. Tulukcuoglu-Guneri, J. Champ, F.C. Bidard, J.Y. Pierga, J. Klijanienko, I. Draskovic, L. Malaquin, J.L. Viovy, S. Descroix. **Lab on Chip**, 15(3), 811-22, 2015.

**Clinical relevance of KRAS-mutated sub-clones detected with picodroplet digital PCR in advanced colorectal cancer treated with anti-EGFR therapy**. Laurent-Puig, D. Pekin, C. Normand, S.K. Kotsopoulos, P. Nizard, K. Perez-Toralla, R.

Rowell, J. Olson, P. Srinivasan, D. Le Corre, T. Hor, Z. El Harrak, X. Li, D.R. Link, O. Bouché, J-F. Emile, B. Landi, V. Boige, J.B. Hutchison, V. Taly, **Clinical Cancer Research**, 21(5), 1087-97, 2015.

**A three dimensional thermoplastic microfluidic chip for robust cell capture and high resolution imaging**. G. Mottet, K. Perez-Toralla, E. Tulukcuoglu, F.C. Bidard, J.Y. Pierga, I. Draskovic, A. Londono-Vallejo, S. Descroix, L. Malaquin and J.L. Viovy, **BIOMICROFLUIDICS**, 8(2), Article Number: 024109, DOI: 10.1063/1.4871035

**Superhydrophobic silica surfaces: fabrication and stability**. A. L. Dubov, K. Perez-Toralla, A. Letailleur, E. Barthel and J. Teisseire, **J. Micromech. Microeng.**, 23(12), 125013, 2013, doi:10.1088/0960-1317/23/12/125013

**New non-covalent strategies for stable surface treatment of thermoplastic chips**. K. Perez-Toralla, J. Champ, M. R. Mohamadi, O. Braun, L. Malaquin, J-L. Viovy and S. Descroix, **Lab on Chip**, 2013, 22 (4409-4418). See <http://pubs.rsc.org/en/content/articlelanding/2013/lc/c3lc50888a#!divAbstract>

**High flowability monomer resists for thermal nanoimprint lithography**. K. Perez-Toralla, J. De Girolamo, D. Boutry, M. Zelsmann, J. Boussey, C. Gourgon, **Microelectronic Engineering**, 86(4-6), 2009

**Comparison of monomer and polymer resists in thermal nanoimprint lithography**. M. Zelsmann, K. Perez-Toralla, J. De Girolamo, D. Boutry, C. Gourgon, **J. Vac. Sci. Technol. B**, 26(6), 2008

#### *Selected conferences:*

**EMBL Conference – Microfluidics 2012, 25 - 27 July 2012, Heidelberg (Germany)**. «FISH-on-a-Chip : an integrated platform for genomic analysis of captured circulating tumour cells», K. Perez-Toralla, Guillaume Mottet, Ezgi Tuluckuoglu, Jérôme Champ, Irena Draskovic, Stéphanie Descroix, Jean-Louis Viovy. Poster.

**ASME2011 - The Ninth International Conference on Nanochannels, Microchannels, and Minichannels, 19-22 June 2011, Edmonton (Canada)**. «FISH IN CHIPS: molecular typing of HER2 biomarker for rapid and low cost cancer diagnosis», K. Perez-Toralla, G. Mottet, I. Draskovic, L. Malaquin, J-L Viovy. Oral communication

**µFlu 2010 Second European Conference in Microfluidics, 8-10 December 2010 Toulouse, (France)** «FISH IN CHIPS: molecular typing of HER2 biomarker for rapid and low cost cancer diagnosis», K. Perez-Toralla, G. Mottet, I. Draskovic, L. Malaquin, J-L Viovy. Oral communication

**Converciencia 2010, 26-30 July 2010, Guatemala City, (Guatemala)**. « Nanotecnología y microsistemas en el Institut Curie », Taller: Nanotecnología para Guatemala. K. Perez-Toralla, A.E. Saliba, L. Saias, J. Autebert, F.D. Delapierre, G. Mottet, L. Malaquin, J.L. Viovy. Invited oral communication