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|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CONTACT INFORMATION      | <b>The FIRC Institut of Molecular Oncology<br/>IFOM</b><br>Via Adamello 16, 20139<br>Milan Italy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Phone: (39) 02 5743 03200<br>Cell Phone (39) 38 0129 7035<br><b>Email:</b> nils.gauthier@ifom.eu<br><b>Web site:</b> <a href="http://www.ifom.eu/en/">http://www.ifom.eu/en/</a> |
| RESEARCH<br>INTEREST     | Cell Biology<br>Biophysics<br>Membrane Dynamics (Endocytosis, Membrane Trafficking, Exocytosis, Phagocytosis)<br>Cytoskeleton remodeling<br>Cellular Microbiology<br>Host Pathogen Interaction<br>Bacterial Toxins                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                  |
| ACADEMIC<br>APPOINTMENTS | <b>At IFOM Milan and University of Milan</b><br><br><b>□Jan 2016-current:</b> Group leader IFOM Milan Italy. Assistant Professor European School of Molecular Medicine (SEMM) Milan Italy<br><br><b>At National University of Singapore</b><br><br><b>□Nov 2011-Jan 2016:</b> MBI Fellow (Junior Group Leader)<br>Mechanobiology Institute<br><br><b>□Nov 2010-Oct 2011:</b> Senior research Fellow<br>Mechanobiology Institute<br><br><b>At Columbia-University, New York, NY USA</b><br><br><b>□Jul 2005-Jul 2010:</b> Post-Doctoral Fellow<br>Supervisor: Pr Michael Sheetz                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                  |
| EDUCATION                | <b>University of Nice-Sophia Antipolis, Nice, France</b><br><br><b>2004</b> Ph.D in Cell and Molecular Biology<br>Supervisor: Pr Patrice BOQUET, Unité INSERM U627<br>Subject: Endocytosis and intracellular traffic of the Helicobacter-pylori VacA cytotoxin<br><b>2000</b> DEA in cell biology<br><b>1999</b> Master's degree in Biochemistry<br><b>1998</b> Bachelor's degree in Biochemistry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                  |
| FUNDING                  | Seed Grant Group Leader IFOM<br>January 2016-December 2020<br>100.000 EUR a year for 5 years (500.000 Euros)<br><br>Junior Group leader grant WBS R-714-016-007-271<br>600.000 SGD for 4 years as lab support funds, Feb 2012- Jan 2016, Mechanobiology Institute, National University of Singapore, Singapore<br><br>French Association against Cancer (ARC), 1 year fellowship (15.000 EUR), awarded but refused because of other support (2003-2004 teacher position).<br><br>LIGUE association against cancer, France, 1 year supports (15.000 EUR), awarded but refused because of other support (2003-2004 teacher position).<br><br>Teacher Assistant Full Fellowship one year 2003-2004 (25.000 EUR) , Ministry of Education, France<br><br>PhD Fellowship, 3 years 2000-2003 (50.000 EUR), Ministry of Education, France, ranked first position (1 against 24)<br><br>Teacher Assistant Supplementary Fellowship, 3 years 2000-2003 (10.000 EUR) Ministry of Education, France |                                                                                                                                                                                  |
| TEACHING                 | <b>2013-current:</b> Membrane Trafficking, 8 hours lecture MB5102 course Structure, <b>Mechanobiology Institute Singapore</b><br><br><b>2012-current:</b> Microbial Pathogenesis: Hijacking cell function by Pathogen: How new discovery where made, 2 hours lecture, MB5102 course Structure, <b>Mechanobiology Institute Singapore</b><br><br><b>2011:</b> Mechanobiology: Force sensing and Cytoskeleton Remodeling with A. Bershadsky, 8 hours class, <b>Mechanobiology Institute Singapore</b><br><br><b>2008-2009:</b> Cell as a machine: introduction to membrane dynamics (2 hours lecture), <b>Columbia University, New York USA</b><br><br><b>2000-2004:</b> Teacher assistant Fellowship given in complement to the first position ranking of PhD Fellowship (96 hours of classroom a year 384 hours of class total) at the <b>University of Nice</b>                                                                                                                        |                                                                                                                                                                                  |

biology.

#### MENTORING (AS PI)

##### **Current lab members**

Dr Pascale Monzo, **Senior research Scientist** IFOM Milan (January 2016-current)  
Camilla Galli **PhD** student IFOM Italy (October 2015-current)  
Dr Bruno Pontes, **Post Doc**, (Brazilian, November 2012-September 2014, September 2016-current)

##### **Past lab members**

Dr Charlotte Guetta, former **PhD** student, (January 2012-december 2016, co-direction with Pr Benoit Ladoux, MBI-University Paris Diderot, France), Post Doc Brown University USA  
Dr Anita Joanna Kosmalska, former **PhD** student (Feb 2012-May 2016, co-direction with Pere Roca-Cusachs, IBEC, Barcelona, Spain). Grant Admin Work University of Barcelona  
Dr Jagadish Sankaran, former **Post Doc**, (Indian, January 2012 –May 2015)  
Dr Thomas Masters, former **Post Doc**, (English, now in Cambridge University UK) (July 2011-May 2013)  
Malte Ohmstede, former **Undergraduate**, (German, 2 months internship July-August 2012)  
Sophie Kan, former **Undergraduate** now Graduate Student, (French, 4 months internship part of the Master's training January-May 2012)

#### PUBLICATIONS

##### **31 publications published in peer review journals**

**h index: 21** (Google Scholar) as of december 2016

**times cited: 1706** (Google Scholar) as of december 2016

**31-**How cells respond to environmental cues—insights from bio-functionalized substrates  
V Ruprecht, P Monzo, A Ravasio, Z Yue, E Makhija, PO Strale, N Gauthier, GV Shivashankar, Vincent Studer, Corinne Albiges-Rizo, Virgile Viasnoff  
**J Cell Sci, in press**

**30-** $\alpha$ -actinin links ECM rigidity sensing contractile units with periodic cell edge retractions.  
Meacci G, Wolfenson H, Liu S, Stachowiak MR, Iskratsch T, Mathur A, Ghassemi S, Gauthier N, Tabdanov E, Lohner J, Gondarenko A, Chander AC, Roca-Cusachs P, O'Shaughnessy B, Hone J, Sheetz MP.  
**Mol Biol Cell.** 2016 Apr 27.

**29-**F-actin waves, actin cortex disassembly and focal exocytosis driven by actin-phosphoinositide positive feedback.  
Masters TA\*, Sheetz MP, Gauthier NC\*.  
**Cytoskeleton.** 2016 Apr;73(4):180-96.  
**\* Corresponding authors**

**28-** Mechanical confinement triggers glioma linear migration dependent on formin FHOD3.  
Monzo P, Chong YK, Guetta-Terrier C, Krishnasamy A, Sathe SR, Yim EK, Ng WH, Ang BT, Tang C, Ladoux B, Gauthier NC, Sheetz MP.  
**Mol Biol Cell.** 2016 Apr 15;27(8):1246-61

**27-** Protrusive Waves Guide 3D Cell Migration along Nanofibers  
Charlotte Guetta-Terrier, Pascale Monzo, Jie Zhu, Hongyan Long, Lakshmi Venkatraman, Yue Zhou, PeiPei Wang, Chew Sing Yian, Alexander Mogilner, Benoit Ladoux\*, Nils C. Gauthier1\*  
**J. Cell Biol.** 2015  
**\* Corresponding authors**

**26-** Physical principles of membrane remodelling during cell mechanoadaptation.  
Kosmalska AJ, Casares L, Elosegui-Artola A, Thottacherry JJ, Moreno-Vicente R, González-Tarragó V, del Pozo MÁ, Mayor S, Arroyo M, Navajas D, Trepas X, Gauthier NC\*, Roca-Cusachs P\*.  
**Nat Commun.** 2015 Jun 15;6:7292.  
**\* Corresponding authors**

**25-**The effects of nanofiber topography on siRNA uptake and gene silencing  
Winifred Wing Yiu Yau; Hongyan Long, Nils C Gauthier, Jerry Kok Yen Chan and Sing Yian Chew  
**Biomaterials** 2014 Volume: 37 Pages: 94-106

**24-** Plasma membrane tension orchestrates membrane trafficking, cytoskeletal remodeling, and biochemical signaling during phagocytosis  
Thomas A. Masters, Virgile Viasnoff, You Li and Nils Gauthier\*  
**Proc Natl Acad Sci USA** 2013 Volume: 110 Issue: 29 Pages: 11875-11880  
**\* Corresponding author**

**23-** Myosin 1E localizes to actin polymerization sites in lamellipodia, affecting actin dynamics and adhesion formation.  
Gupta P, Gauthier NC, Cheng-Han Y, Zuanning Y, Pontes B, Ohmstede M, Martin R, Knölker HJ, Döbereiner HG, Krendel M, Sheetz M.  
**Biol Open.** 2013 Dec 15;2(12):1288-99. doi: 10.1242/bio.20135827.

**22-** Integrin-dependent force transmission to the extracellular matrix by  $\alpha$ -actinin triggers adhesion maturation

Pere Roca-Cusachs, Armando del Rio, Eileen Faucher, Nils C. Gauthier, Nicolas Biais, Michael P. Sheetz

**Proc Natl Acad Sci USA** 2013 Volume: 110 Issue: 15 Pages: 1361-E1370

**21-Mechanical Feedback between Membrane Tension and Dynamics**

Nils C. Gauthier\*, Thomas M. Masters, Michael P. Sheetz

**Trends in Cell Biology**, 2012 Volume: 22 Issue: 10 Pages: 527-535

**\* Corresponding author**

**20-Physarum polycephalum percolation as a paradigm for topological phase transitions in transportation networks**

Adrian Fessel, Christina Oettmeier, Erik Bernitt, Nils C. Gauthier, Hans-Günther Döbereiner

**Physical Review Letter**, 2012 Volume: 109 Issue: 7 Article Number: 078103

Cover featured August 17

Science News reviewed August 2012

**19-Easy fabrication of thin membranes with through holes. Application to protein patterning**

Thomas Masters, Wilfried Engl, Zhe Lancelot Weng, Bakya Ashwin, Nils C. Gauthier, Virgile Viasnoff.

**PLoS ONE**, 2012 Volume: 7 Issue: 8 Article Number: e44261

**18-Cell crawling mediates collective cell migration to close undamaged epithelial gaps"**

Ester Anon, Xavier Serra-Picamal, Pascal Hersen, Nils C. Gauthier, Michael P. Sheetz, Xavier Trepat, Benoit Ladoux

**Proc Natl Acad Sci USA** 2012 Volume: 109 Issue: 27 Pages: 10891-10896

**17-Temporary Increase in Plasma Membrane Tension Coordinates the Activation of Exocytosis and Contraction during Cell Spreading.**

Gauthier N.C., Fardin M.A., Roca-Cusachs P., and Sheetz M.P.

**Proc Natl Acad Sci USA** 2011 Volume: 108 Issue: 35 Pages: 14467-14472

Faculty of 1000 evaluated: FFA10, 2 evaluations

Cover Featured in the August 30 2011 issue of PNAS

Commented in the August 30 2011 issue of PNAS by Kinneret Keren: Membrane tension leads the way, *Proc Natl Acad Sci USA* 2011 Aug 30, 14379-80

**16-Physiological response to membrane protein overexpression in E. coli.**

Gubellini F, Verdon G, Karpowich NK, Luff JD, Boel G, Gauthier N, Handelsman SK, Ades S, Hunt JF.

**Mol Cell Proteomics**. 2011 Jun 30.

**15-Bacillus sphaericus binary toxin elicits host cell autophagy as a response to intoxication.**

Opota O, Gauthier NC, Doye A, Berry C, Gounon P, Lemichez E, Pauron D.

**PLoS ONE**. 2011 Volume: 6 Issue: 2 Article Number: e14682

**14-Filamin depletion blocks endoplasmic spreading and destabilizes force-bearing adhesions.**

Lynch CD, Gauthier NC, Biais N, Lazar AM, Roca-Cusachs P, Yu CH, Sheetz MP.

**Mol Biol Cell**. 2011 Volume: 22 Issue: 8 Pages: 1263-1273

Faculty of 1000 : poster selected ASCB meeting 2009

**13-Cell spreading as a hydrodynamic process**

Fardin MA, Rossier OM, Rangamani P, Avigan PD, Gauthier NC, Vonnegut W, Mathur A, Hone J, Iyengar R, Sheetz MP

**Soft Matter** 2010 Volume: 6 Issue: 19 Pages: 4788-4799

**12-Force generated by actomyosin contraction builds bridges between adhesive contacts.**

Rossier OM, Gauthier N, Biais N, Vonnegut W, Fardin MA, Avigan P, Heller ER, Mathur A, Ghassemi S, Koeckert MS, Hone JC, Sheetz MP.

**EMBO J**. 2010 Volume: 29 Issue: 6 Pages: 1055-1068

**11-Cytoskeletal coherence requires myosin-IIA contractility.**

Cai Y, Rossier O, Gauthier NC, Biais N, Fardin MA, Zhang X, Miller LW, Ladoux B, Cornish VW, Sheetz MP.

**J Cell Sci**. 2010 Volume: 123 Issue: 3 Pages: 413-423

**10-Plasma membrane area increases with spread area by exocytosis of a GPI-anchored protein compartment.**

Gauthier NC, Rossier OM, Mathur A, Hone JC, Sheetz MP.

**Mol Biol Cell**. 2009 Volume: 20 Issue: 14 Pages: 3261-3272

Incytes from MBC July, Vol 20

Cover caption of the October 15 2009 issue of MBoC

**9-Clustering of alpha(5)beta(1) integrins determines adhesion strength whereas alpha(v)beta(3) and talin enable mechanotransduction.**

Roca-Cusachs P, Gauthier NC, Del Rio A, Sheetz MP.

**Proc Natl Acad Sci U S A**. 2009 Volume: 106 Issue: 38 Pages: 16245-16250

Faculty of

1000 evaluated : FFA9 : 2 evaluations

**8-Early endosomes associated with dynamic F-actin structures are required for late trafficking of H. pylori VacA toxin.**

Gauthier NC, Monzo P, Gonzalez T, Doye A, Oldani A, Gounon P, Ricci V, Cormont M, Boquet P.

**J Cell Biol**. 2007 Volume: 177 Issue: 2 Pages: 343-3547

**7-Helicobacter pylori VacA toxin: a tool to study novel early endosomes.**

Gauthier NC, Ricci V, Landraud L, Boquet P.  
**Trends in Microbiology**. 2006 Volume: 14 Issue: 7 Pages: 292-294

**6-**Disruption of autophagy at the maturation step by the carcinogen lindane is associated with the sustained mitogen-activated protein kinase/extracellular signal-regulated kinase activity.  
Corcelle E, Nebout M, Bekri S, **Gauthier N**, Hofman P, Poujeol P, Fénichel P, Mograbi B.  
**Cancer Res.** 2006 Jul 1;**66**(13):**6861-70**.

**5-**Helicobacter pylori VacA cytotoxin: a probe for a clathrin-independent and Cdc42-dependent pinocytic pathway routed to late endosomes.  
Gauthier NC, Monzo P, Kaddai V, Doye A, Ricci V, Boquet P.  
**Mol Biol Cell.** 2005 Volume: 16 Issue: 10 Pages: 4852-4866

**4-**Clues to CD2-associated protein involvement in cytokinesis.  
Monzo P, Gauthier NC, Keslair F, Loubat A, Field CM, Le Marchand-Brustel Y, Cormont M.  
**Mol Biol Cell.** 2005 Volume: 16 Issue: 6 Pages: 2891-2902

**3-**Glycosylphosphatidylinositol-anchored proteins and actin cytoskeleton modulate chloride transport by channels formed by the Helicobacter pylori vacuolating cytotoxin VacA in HeLa cells.  
Gauthier NC, Ricci V, Gounon P, Doye A, Tauc M, Poujeol P, Boquet P.  
**J Biol Chem.** 2004 Volume: 279 Issue: 10 Pages: 9481-9489

**2-**Rac GTPase instructs nuclear factor-kappaB activation by conveying the SCF complex and Ikbalpha to the ruffling membranes.  
Boyer L, Travaglione S, Falzano L, Gauthier NC, Popoff MR, Lemichez E, Fiorentini C, Fabbri A.  
**Mol Biol Cell.** 2004 Volume: 15 Issue: 3 Pages: 1124-1133

**1-**Gastric cell apoptosis and H. pylori: has the main function of VacA finally been identified?  
Boquet P, Ricci V, Galmiche A, Gauthier NC.  
**Trends in Microbiology**. 2003 Volume: 11 Issue: 9 Pages: 410-413

CONFERENCES  
(SPEAKER ONLY)

**As a group leader:**

- Gordon Conference Fibronectin and adhesion February 2017
- Randall Seminar, King's College, May 2016 London
- ASCB 2015 San Diego (student work selected)
- IMB-MBI 2015 Brisbane
- Cell Mech 2015 Barcelona
- UNSW Sydney 2014
- ASCB 2014 Philadelphia
- CRBM-CNRS 2014, Montpellier, France
- “Biomembrane Days” from September 1 to 3, 2014 in Berlin Germany Invited Speaker
- Curie Institut Paris France, 2014 Invited speaker
- MBI Manchester university meeting 2013, Singapore Speaker and organizer
- MBI-WEISMAN meeting 2013, Singapore Speaker and organizer
- Mechanical manipulations of the cell and beyond 2013, NCBC India Invited Speaker
- Institut Jacques Monod, 2013, France Invited speaker

**As a Post Doc**

ASCB 2007, Washington Dc, USA,  
Speaker, Myosin II contraction is synchronized with exocytosis during cell spreading.

**As a PhD**

ELSO meeting 2003, Dresden, Germany,  
Speaker: The channel formed by Helicobacter pylori vacA toxin triggers its pinocytosis.