Name: BERHANU
First Name: Michaël
Birth date: 3 November 1980
Nationality: French
E-mail: michael.berhanu@univ-paris-diderot.fr
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Position:

From October 2010: Permanent researcher (CR1) **CNRS** in the laboratory " Matière et Systèmes Complexes" **MSC** ("*Matter and Complex systems"*) of the **Université Paris Diderot.**

Current research interests:

● Hydrodynamics of erosion by dissolution and application to geomorphology

● Surface Waves and Wave Turbulence. Gravity-capillary wave turbulence.
Surface waves generation by an underwater moving bottom

●Turbulence and free surface flows. Interaction between surface waves and flows.

●Granular gas of magnetized particles

● Capillarity and aggregation of floating particles.

Previous research appointments and education:

2008-2010 : Post-doctoral research at **Clark University** (Massachusetts/USA) in the group of **Arshad Kudrolli**. Experimental research about granular physics, capillarity, geomorphology.

2005-2008 : PhD Student at the laboratory of statistical physics (LPS) in the « Ecole Normale Supérieure » (**ENS**). PhDThesis under the guidance of **Stephan Fauve** and **Nicolas Mordant** and defended September 15th 2008 : « Turbulent magnetohydrodynamics in liquid metals flows ».

2004-2005 : Master 2 of Physics at the ENS Lyon, option statistical physics and out of equilibrium phenomena.

2003-2004 : Agregation de Sciences Physiques (2004) (National Competitive Exam for teaching in High school and at bachelor level)

2001-2005 : Student at the Ecole Normale Supérieure de Lyon (ENS-Lyon)
Master and Bachelor of physics (2001-2005), ENS-Lyon

1998-2001 : Undegraduate studies, Lycée Chaptal, Paris

Summary:

- 26 articles in international peer-reviewed journals
- 13 invited seminars
- 5 invited talk in international conferences
- 7 Conferences Proceedings

Membership : *European Mechanics Society(*Euromech*), Société Française de Physique* (SFP) and *American Physical Society (APS)*.

Referee for Physical Review Letters, Physical Review E, Europhysics Letters, Langmuir, International Journal of Heat and Fluid Flow

Service:

● Co-organization of workshop : « Non-linear Hydrodynamic Waves: Wave interactions and Wave turbulence » Paris Septembre 2013

● Co-organization of general seminars of the laboratory MSC since Septembre 2011.

● Co-organization of specialized seminars « Dynamics of out equilibrium systems » at the laboratory MSC since March 2010.

Teaching expérience:

● 2014- 2015 : Experimental physics projects, Physics Department, University Paris Diderot (96h by year)

● June-July 2011 : Oral examination at undergraduate Level for aspiring engineer students.

● 2005-2008 : Teaching assistant at the Ecole Normale Supérieure de Paris (ENS) in physics: Experimental physics and Hydrodynamics

Advising :

- Adrien Guérin (from September 2017). Postdoctoral researcher (co-supervised with Sylvain Courrech du Pont) ANR ERODISS (24 months) Hydrodynamics of erosion by dissolution.
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- Cyril Ozouf (March 2017/July 2017) Stagiaire de Master 2, (co-encadré avec Sylvain Courrech du Pont). Hydrodynamique de l'érosion par dissolution. Solutal convection

- Julien Philippi (June 2016/december2016). Postdoctoral researcher (co-supervised with Julien Derr and Sylvain Courrech du Pont). CNRS (6 months). Hydrodynamics of erosion by dissolution.

- Annette Cazaubiel (January 2016/June 2016) Internship Master 2, (co-supervised with Eric Falcon) Submerged fountain and surface waves.

- Caroline Cohen (November 2014/Mai 2016) Postdoctoral researcher (co-supervised with Sylvain Courrech du Pont) ANR Exodunes (18 months). Hydrodynamics of erosion by dissolution.

- Florence Haudin (February 2015/ January 2016). Postdoctoral researcher (co-supervised with Eric Falcon) ANR Turbulon (12 months). Resonant interactions between waves. Bathymetry effect on soliton propagation.

- Annette Cazaubiel (July 2014) Internship L3, ENS
  Experimental investigation of 3 wave interaction for capillary waves.

- Simon Merminod (October 2013/October 2016) Phd Student (co-supervised with Eric Falcon) Université Paris Diderot., (Internship M2 entre janvier et juillet 2013).
  Subject : 2D Magnetic Granular Gas

- Leonardo Gordillo (November 2012/November 2014) Postdoctoral researcher (co-supervised with Eric Falcon). Bourse Axa Research Fund Fellowship (2 years), project "Generation of tsunami waves".

- Timothée Jamin (October 2012/January 2015) Phd Student (co-supervised with avec Eric Falcon). Funding: DGA CNRS. : Subject : Surface waves and flows interactions : tsunamis, breaking, turbulence.

- Matthieu Leclerc (juin 2012) Internship L3, Université Paris Diderot,
  Gravity-capillary turbulence (co-supervised with Eric Falcon)

- Marie-Julie Dalbe (de mai à juillet 2010) Internship Master from ENS Lyon, at Clark University

- Darija Cosic (2009/2010) Undergraduate student (Junior) at Clark University

- Joshua Meyer (2008/2009) Undergraduate student (Senior) at Clark University

Invited communications:

● Wave Turbulence of Gravity-capillary surface wavess.
Congreso de la division de dinamica de Fluidos, Puebla, Mexique, November 2015

● *Wave Turbulence of Gravity-capillary surface wavess.*
Cargèse summer school " Wave propagation in complex media", August 2015

● *Magnetic Granular Gas"*
Seminario Extraordinario DFI, Universidad del Chile, Santiago Chili, November 2014

● *Experimental investigation of three-wave interactions of capillary surface-waves.*
Dynamics days South America, Valparaiso Chili November 2014

●*Gaz granulaire magnétique.*
Séminaire du Laboratoire de Physique Statistique ENS (Paris) April 2014

●*Agrégats granulaires formés par attraction capillaire .*
Séminaire Képler, laboratoire NAVIER, ENPC (France) January 2014

●*Magnetic Granular Gas.*
Physics Colloquium, Clark University (USA) November 2013

●*Turbulence d'ondes capillaires.*
Séminaire fluides de l'institut Jean Le Rond d'Alembert (Paris) April 2013

● *Aggregates shaped by capillarity.*
Séminaire du SPEC CEA Saclay (France) September 2012

● *Spatial statistics of capillary wave turbulence.*
Physics Colloquium, Clark University (USA) November 2011

● *Granular aggregates with capillary interactions*
Séminaire du GRASP Université de Liège (Belgium) March 2011

● *Granular aggregates with capillary interactions.*
Soft matter Seminar, Georgetown University (USA) August 2010

● *Granular aggregates with capillary interactions.*
Seminar of the center for Fluid mechanics, **Brown University** (USA) May 2010

● *MHD measurements with liquid Gallium, to understand turbulent dynamos.*
Séminaire LGIT Université Joseph Fourier *(*Grenoble) March 2010

● *Structure of a capillary granular aggregate.*
Role of rain in seepage erosion of granular material
Séminaire du laboratoire Matière et systèmes complexes (MSC) :
Université Paris Denis Diderot Décember 2009

● *New results on the VKS experimental turbulent dynamo*
European geophysical union meeting, Vienne (Austria) April 2008

● *VKS : a turbulent homogeneous dynamo with liquid sodium*
Physics Colloquium, Clark University (USA) March 2008

Publications:

1. L. Deike, M. Berhanu and Eric Falcon. « Observation of hydroelastic three-wave interactions» **Physical Review Fluids**, **2, 064803 (2017)**

2. C. Cohen, M. Berhanu, J. Derr and S. Courrech du Pont
« Erosion patterns on dissolving and melting bodies »
(2015 Gallery of Fluid motion) **Physical Review Fluids, 1, 050508 (2016)**

3. F. Bonnefoy, F. Haudin, G. Michel, B. Semin, T. Humbert, S. Aumaître, E. Falcon
« Observation of resonant interactions among surface gravity waves »
Journal of Fluid Mechanics (Rapids) 805, R3 (2016)

4. F. Haudin, A. Cazaubiel, L. Deike, T. Jamin, E. Falcon and **M. Berhanu**,
«Experimental study of three-wave interactions among capillary-gravity surface waves»
Physical Review E, 93, 043110 (2016)

5. S. Merminod, T. Jamin, Eric Falcon and **M. Berhanu**
«Transition to a labyrinthine phase in a driven granular medium»
Physical Review E 92, (2015)

6. L. Deike, B. Miquel, P. Gutiérrez, T. Jamin, B. Semin, **M. Berhanu**, E. Falcon, F. Bonnefoy
«Role of the basin boundary conditions in gravity wave turbulence »
Journal of Fluid Mechanics 781 (2015)

7. T.Jamin, L. Gordillo, G. Ruiz-Chavarría, **M. Berhanu** and E. Falcon
«Experiments on generation of surface waves by an underwater moving bottom»
Proceedings of the Royal Society A 471, (2015)

8. L. Deike, D. Fuster, **M. Berhanu** and Eric Falcon.

«Direct numerical simulation of capillary wave turbulence»
Physical Review Letters 112 (2014)

9. S. Merminod, **M. Berhanu** and Eric Falcon
«Transition from a dissipative to a quasi-elastic system of particles with tunable repulsive interactions»
Europhysics Letters 106, (2014) (Editor's choice).

10. L. Deike, **M. Berhanu** and Eric Falcon
«Energy flux measurement from the dissipated energy in capillary wave turbulence»,
Physical Review E 89 (2014).

11. **M. Berhanu** and E. Falcon
«Space-time resolved capillary wave turbulence »
Physical Review E 87 (2013)

12. M. Dasgupta, B. Liu, H.C. Fu, **M. Berhanu**, K.S. Breuer, T.R. Powers and A. Kudrolli
« Speed of a Swimming Sheet in Newtonian and Viscoelastic Fluids»
Physical Review E 87 (2013)

13. **M. Berhanu**, A. Petroff, O. Devauchelle, A. Kudrolli and D.H. Rothman
« Shape and dynamics of seepage erosion in a horizontal granular bed»
Physical Review E 86 (2012)

14. L. Deike, **M. Berhanu** and E. Falcon
«Decay of capillary wave turbulence »
Physical Review E 85 (2012)

15. M.-J. Dalbe, D. Cosic, **M. Berhanu**, A. Kudrolli
«Aggregation of frictional particles due to capillary attraction»
Physical Review E 83, (2011)

16. **M. Berhanu**, G. Verhille, J. Boisson, B. Gallet, C. Gissinger, S. Fauve, N. Mordant, F. Pétrélis, M. Bourgoin, Ph. Odier, J.-F. Pinton, N. Plihon, S. Aumaître, A. Chiffaudel, F. Daviaud, B. Dubrulle, C. Pirat,
«Dynamo regimes and transitions in the VKS2 experiment»
European Physical Journal B 77 (2010)

17. **M. Berhanu**, A. Kudrolli
« Heterogeneous structure of granular aggregates with capillary interactions »
Physical Review Letters 105 (2010)

18. **M. Berhanu**, B. Gallet, R. Monchaux, M. Bourgoin, Ph. Odier, J.-F. Pinton, N. Plihon, R. Volk, S. Fauve, N. Mordant, F. Pétrélis, S. Aumaître, A. Chiffaudel, F. Daviaud, B. Dubrulle, F. Ravelet,
«Bistability between a stationary and an oscillatory dynamo in a turbulent flow of liquid sodium»
Journal of Fluids mechanics 641 (2009)

19. B. Gallet, **M. Berhanu**, N. Mordant
« Influence of an external magnetic field on forced turbulence in a swirling flow of liquid metal »
Physics of Fluids 21 (2009)

20. R. Monchaux, **M. Berhanu**, S. Aumaître, A. Chiffaudel, F. Daviaud, B. Dubrulle, S. Fauve, F. Ravelet, N. Mordant, F. Pétrélis, M. Bourgoin, Ph. Odier, J.-F. Pinton, N. Plihon, R. Volk
« The VKS experiment : a turbulent dynamo »
Physics of Fluids 21 (2009)

21. **M. Berhanu**, B. Gallet, N. Mordant, S. Fauve
« Reduction of velocity fluctuations in a turbulent flow of gallium by an external magnetic field »
Physical Review E 78,1, (2008)

22. S. Aumaître, **M. Berhanu**, M. Bourgoin, A. Chiffaudel, F. Daviaud, B. Dubrulle, S. Fauve, L. Marié, R. Monchaux, N. Mordant, P. Odier, F. Pétrélis, J.-F. Pinton, N. Plihon, F. Ravelet, R. Volk
« The VKS experiment: turbulent dynamical dynamos »
Comptes Rendus Physique 9,7 (2008)

23. F. Ravelet, **M. Berhanu**, R. Monchaux, S. Aumaître, A. Chiffaudel, F. Daviaud, B. Dubrulle, M. Bourgoin, P. Odier, J.-F. Pinton, R. Volk, S. Fauve, N. Mordant and F. Pétrélis
« Chaotic dynamos generated by a turbulent flow of liquid sodium»
Physical Review Letters 101, (7) (2008)

24. R. Monchaux, **M. Berhanu**, M. Bourgoin, Ph. Odier, M. Moulin, J.-F. Pinton, R. Volk, S. Fauve, N. Mordant, F. Pétrélis, A. Chiffaudel, F. Daviaud, B. Dubrulle, C. Gasquet, L. Marié, and F. Ravelet « Generation of magnetic field by a turbulent flow of liquid sodium»,
Physical Review Letters 98, (2007)

25. **M. Berhanu**, R. Monchaux, S. Fauve, N. Mordant, F. Pétrélis, A. Chiffaudel, F. Daviaud, B. Dubrulle, C. Gasquet, L. Marié, and F. Ravelet, M. Bourgoin, Ph. Odier, M. Moulin, J.-F. Pinton, R. Volk
« Magnetic field reversals in an experimental turbulent dynamo »
Europhysics Letters 77, (2007)

26. R. Volk, F. Ravelet, R. Monchaux, **M. Berhanu**, A. Chiffaudel, F. Daviaud, P. Odier, J.-F. Pinton, S. Fauve, N. Mordant and F. Pétrélis
« Transport of magnetic field by a turbulent flow of liquid sodium »
Physical Review Letters 97, (2006)