

# Curriculum Vitae - Martin Brandenbourger

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## Higher education

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- 2007-2010 **Bachelor in fundamental Physics**, with High Honors  
*Université de Liège (Liège, Belgium)*
- 2010-2012 **Master in Physics**, The Highest Honors  
*Université de Liège (Liège, Belgium)*
- 2012-2016 **Ph.D. student in Physics - AIP MicroMast & FRIA fellowship**, *GRASP Université de Liège (Liège, Belgium)*  
Conducted research on electrically charged droplets and their interaction with electric fields, under the supervision of Stéphane Dorbolo.

## Position held

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- 2016-2017 **Postdoctoral Fellow - B.A.E.F. grant**, *MOSS Boston University (Boston, United States)*  
Conducted research on the interplay between elastic structures and granular materials with Prof. Douglas Holmes.
- 2017-2020 **Postdoctoral Researcher**, *Soft Matter Group University of Amsterdam (Amsterdam, Netherlands)*  
Research on active mechanical metamaterials with Dr .Corentin Coulais.
- 2020-2021 **Postdoctoral Researcher**, *TIPs Laboratory Université Libre de Bruxelles ULB (Brussels, Belgium)*  
Research on active fluid-structure interactions with Prof. Pierre Lambert.

## Current Positions

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- 2021-present **CNRS Researcher, Chargé de recherche**, *IRPHÉ Laboratory Aix-Marseille Université (Marseille, France)*  
Research on active fluid-structure interactions and biological flows.

## Scientific Output & Awards

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- Publications 12 publications (including 1 PNAS, 1 Nat. Commun., 2 PRL) - 621 citations.
- Conferences More than 25 talks and invited talks including APS March Meeting (2017-2021), European Solid Mechanics Conference (2018), APS DFD (2014, 2015).
- Grants 7 grants written and obtained as principal investigator (total : 311 000 €) :
1. AAP PEPS, INSIS (2022).
  2. Fonds Emile Defay, Universit Libre de Bruxelles (2021).
  3. Postdoctoral fellowship from *FRS-FNRS* (2020).
  4. Postdoctoral fellowship from *Belgian American Education Foundation* (2016).
  5. Founding for Parabolic Flights from *European Space Agency* (2013, 2014).
  6. Founding in hyper gravity research from *European Space Agency* (2013).
  7. Ph.D. scholarship from *FRIA FRS-FNRS* (2013).

## Teaching & Outreach

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- Teaching Mechanics of Soft microrobotics course (Master 1 - lectures 2021)  
Hydrodynamics course (Master 1 - lectures and tutorials, 2020, 2019)  
General physics practicals (Bachelor 1 - 2011,2012).  
15 Master Thesis supervision, 3 Bachelor Thesis supervisions.
- Outreach Printemps des Sciences Liège (2013).  
Exposition Science et Culture (2014, 2015).  
University open Days (2019).
- Media Outreach *Wheel Made of Odd Matter Spontaneously Rolls Uphill* (quanta magazine, 2022)  
*Vibration in one direction only* (phys.org, 2019).  
*One way vibrations in robotic metamaterials* (youtube, 2019).  
*Saiba que experincias se fazem em queda livre na atmosfera terrestre* (Observador, 2014).

## Publications

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The symbol † indicates co-first authorship

### Publications under revision

M. Brandenbourger, C. Scheibner, J. Veenstra, V. Vitelli, C. Coulais, *Active impact and locomotion in robotic matter with nonlinear work cycles*. arXiv preprint arXiv :2108.08837  
<https://doi.org/10.48550/arXiv.2108.08837>

E. Zheng, M. Brandenbourger, L. Robinet, P. Schall, E. Lerner, C. Coulais *Self-oscillation and synchronisation transitions in elasto-active structures*. arXiv preprint arXiv :2106.05721  
<https://doi.org/10.48550/arXiv.2106.05721>

## Publications in international peer-reviewed journals

A. Ghatak<sup>†</sup>, **M. Brandenbourger**<sup>†</sup>, J. van Wezel, and C. Coulais, *Observation of non-Hermitian topology and its bulk edge correspondence in an active mechanical metamaterial*, Proc. Natl. Acad. Sci. U.S.A. **117**, 29561 (2020).

<https://doi.org/10.1073/pnas.2010580117>

**M. Brandenbourger**, A. Dangremont, R. Sprik, and C. Coulais, *Tunable flow asymmetry and flow rectification with bio-inspired soft leaflets*, Phys. Rev. Fluids **5**, 084102 (2020).

<https://journals.aps.org/prfluids/abstract/10.1103/PhysRevFluids.5.084102>

**M. Brandenbourger**, X. Locsin, E. Lerner, and C. Coulais, *Non-reciprocal robotic metamaterials*, Nat. Commun. **10**, 4608 (2019).

<https://www.nature.com/articles/s41467-019-12599-3>

**M. Brandenbourger**, S. Dorbolo, and B. Darbois-Textier, *Toy geyser experiment : periodicity, operating conditions and coupling*, Eur. J. Phys. **40**, 025803 (2019).

<https://iopscience.iop.org/article/10.1088/1361-6404/aafbf4>

D. J Schunter, **M. Brandenbourger**, S. Perriseau, and D. P Holmes, *Elastogranular mechanics : Buckling, jamming, and structure formation*, Phys. Rev. Lett. **120**, 078002 (2018).

<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.120.078002>

**M. Brandenbourger**, H. Caps, Y. Vitry, and S. Dorbolo, *Electrically Charged Droplets in Microgravity*, Microgravity Sci. Technol. (2017).

<https://link.springer.com/article/10.1007/s12217-017-9542-0>

L. Maquet, B. Darbois-Textier, A. Duchesne, **M. Brandenbourger**, B. Sobac, A. Rednikov, P. Colinet, and S. Dorbolo, *Leidenfrost drops on a heated liquid pool*, Physical Review Fluids **1**, 053902 (2016).

<https://journals.aps.org/prfluids/pdf/10.1103/PhysRevFluids.1.053902>

**M. Brandenbourger**, N. Vandewalle, and S. Dorbolo, *Displacement of an Electrically Charged Drop on a Vibrating Bath*, PRL **116**, 044501 (2016).

<https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.116.044501>

L. Maquet, **M. Brandenbourger**, B. Sobac, A.-L. Biance, P. Colinet, and S. Dorbolo, *Leidenfrost drops : Effect of gravity*, EPL **110**, 24001 (2015).

<http://iopscience.iop.org/article/10.1209/0295-5075/110/24001>

**M. Brandenbourger**, and S. Dorbolo, *Electrically charged droplet : case study of a simple generator*, J. Can. Phys. **92**, 1203 (2014).

<http://www.nrcresearchpress.com/doi/abs/10.1139/cjp-2013-0479>

S. Dorbolo, L. Maquet, **M. Brandenbourger**, F. Ludewig, G. Lumay, H. Caps, N. Vandewalle, S. Rondia, M. Mélard, J. van Loon, A. Dowson, and S. Vincent-Bonnieu, *Influence of the gravity on the discharge of a silo*, Granular Matter. **15**, 263 (2013).

<http://link.springer.com/article/10.1007%2Fs10035-013-0403-2>

S. Dorbolo, **M. Brandenbourger**, F. Damanet, H. Dister, F. Ludewig, D. Terwagne, G. Lumay, and N. Vandewalle, *Granular gas in a periodic lattice*, European Journal of Physics **32**, 1465 (2011).

<http://iopscience.iop.org/article/10.1088/0143-0807/32/6/002/pdf>

## Conferences and seminars

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### Invited talks

- Mar. 2022 **APS March meeting**, Chicago (USA)
- Jan. 2021 **Institut Jean Le Rond d'Alembert seminar**, Sorbonne Universit (France)
- Dec. 2020 **IRPHE seminar**, Aix-Marseille Université (France)
- Oct. 2020 **Liphy seminar**, Université Grenoble-Alpes (France)
- Oct. 2020 **Laboratoire de Physique seminar**, ENS Lyon (France)
- Oct. 2020 **IPR seminar**, Université de Rennes (France)
- Feb. 2020 **INPHYNI seminar**, University of Cote d Azur (France)
- Nov. 2019 **PMMH seminar**, ESPCI Paris (France)
- Jun. 2018 **Grasp Lab seminar**, University of Liège (Belgium)
- Aug. 2017 **The Splash Lab seminar**, Utah State University (USA)
- Jun. 2017 **Machine Materials Lab seminar**, University of Amsterdam (Netherlands)

### Conference talks

- Mar. 2021 **APS March meeting**, Online
- Mar. 2020 **APS March meeting**, Denver (USA)
- Oct. 2019 **Workshop on Active Matter for Soft Robotics**, Bruxelles (Belgium)
- Jul. 2019 **DIEP, Topology and broken symmetries : from driven quantum matter to active metamaterials**, Utrecht (Netherlands)
- Mar. 2019 **APS March meeting**, Boston (USA)
- Jan. 2019 **Physics @ Veldhoven**, Veldhoven (Netherlands)
- Aug. 2018 **Solvay workshop**, Bruxelles (Belgium)
- Jul. 2018 **European Solid Mechanics Conference**, Bologna (Italy)
- Mar. 2018 **APS March meeting**, Los Angeles (USA)
- Jan. 2018 **Physics @ Veldhoven**, Veldhoven (Netherlands)
- Mar. 2017 **APS March meeting**, New Orleans (USA)
- Nov. 2015 **Annual Meeting of the APS Division of Fluid Dynamics**, Boston (USA)
- May. 2015 **BPS General Scientific Meeting**, Liège (Belgium)
- Nov. 2014 **Annual Meeting of the APS Division of Fluid Dynamics**, San Fransisco (USA)
- Sep. 2013 **10<sup>th</sup> European Coating Symposium**, Mons (Belgium)
- Jan. 2013 **33<sup>e</sup> Journées de Physique Statistique**, Paris (France)
- Jan. 2012 **32<sup>e</sup> Journées de Physique Statistique**, Paris (France)

### Posters

- Aug. 2021 **ICTAM 2020+1**, online
- Mar. 2019 **Fluid and Elasticity**, Malaga (Spain)
- Sep. 2016 **MicroMast 2016**, Bruxelles (Belgium)
- May. 2015 **BPS General Scientific Meeting**, Liège (Belgium)
- Nov. 2015 **Gallery of Fluid Motion, 68<sup>th</sup> APS Division of Fluid Dynamics**, Boston (USA)

### Workshops

- Mars 2021 **Mécanique de la matière molle (MECAMOLLE)**, online
- May 2019 **The Gulliver days**, Amsterdam (Netherlands)
- Sep. 2015 **AIP MicroMast workshop meeting**, Leuven (Belgium)
- Sep. 2013 **AIP MicroMast workshop meeting**, Durbuy (Belgium)

## Summer Schools

Aug. 2015 **DTU Summer School on Complex Motion in Fluids**, Copenhagen (Denmark)

## Professional activities

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Session Chair *V56 : Interactions of Elastic Structures with Fluids and Granular Matter II*, APS March Meeting 2019, Boston (USA)

Journal papers Reviews Manuscript reviewer, *Communications Materials* 1 x (2022).  
Manuscript reviewer, *Nature Communiacion* 1 x (2020).  
Manuscript reviewer, *Physics Review Letters* 4x (2020, 2019).  
Manuscript reviewer, *Physical Review E* 1x (2018).  
Manuscript reviewer, *Scientific Reports* 1x (2017).  
Manuscript reviewer, *Canadian Journal of Physics* 1x (2011).