Antoine BÉRUT

Institut Lumière Matière
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Academic Curriculum:

2018 - present: **Maître de conférences (~ Associate Professor)** at University Claude Bernard Lyon 1, working at Institut Lumière Matière laboratory and IUT Lyon 1 département GMP (~ Mechanical Engineering Department).

2017 - 2018: **Post-doc** at Institut de Physique de Rennes on ERC project Disfilm under supervision from Isabelle Cantat.

2015 - 2017: **Post-doc** at IUSTI Laboratory on ERC project Plantmove under supervision from Yoël Forterre.

2012 - 2015: **PhD Thesis**: "Fluctuations and Interactions of Brownian particles in multiple Optical Traps", at Laboratoire de Physique de l'ENS Lyon, under supervision from Sergio Ciliberto and Artyom Petrosyan.
PhD defense on July 7 2015 (PhD Thesis available online in open archive TEL-HAL).

Fundings (obtained as PI):

- "Temperature Resolved Imaging from Coordination Polymers PhotoEmission", LABEX iMUST of the University of Lyon (ANR-10-LABX-0064), 160 000€, **2022 - 2024**
- "Flowing dynamics of microscopic granular materials" Agence Nationale de la Recherche (ANR-21-CE30-0005), 190 000€, **2022 – 2025**

PhD Students:

- Jesús Daniel FERNÁNDEZ ESCALANTE, « Flowing dynamics of microscopic granular materials », PhD started on 02/05/2023, co-advised with Loïc Vanel.
- Chloé BRAUX, « Effets thermiques dans la rupture des élastomères », PhD started on 01/11/2023, co-advised with Loïc Vanel.

Scientific awards:

- Prix Sciences et Ingénierie 2019 (Young Researcher Award, City and University of Lyon).
- Prix Saint Gobain 2015 (Young Researcher Award, French Physical Society).
- The article "Experimental verification of Landauer's principle linking information and thermodynamics" has been chosen as one of the "top 10 breakthroughs for 2012" by the *Physics World* journal.

Teaching:

Département Génie Mécanique et Productique (~ Mechanical Engineering) at IUT Lyon 1 (192h/year):

- Dimensional Analysis and Measurement Uncertainty (first year)
- Material sciences (first, second, and third years)
- Electronic (second year)

International Conferences:

- AERC 2024 (Annual European Rheology Conference), Leeds, avril 2024 (oral presentation)
- Transport Phenomena in Complex Environments, Erice, September 2019 (oral presentation)
- Avalanche Dynamics and Precursors of Catastrophic Events, Les Houches, February 2019 (oral presentation)
- Liquids @ Interfaces 2018, Bordeaux, October 2018 (poster)
- ISMC 2016 (International Soft Matter Conference), Grenoble, September 2016 (oral presentation)
- ICTAM 2016 (International Congress of Theoretical and Applied Mechanics), Montréal, August 2016 (oral presentation)

- Stat Phys 26, Lyon, July 2016 (oral presentation)
- Dynamics in Viscous Liquids IV, Montpellier, May 2015 (poster)
- Luxembourg Out of Equilibrium, Luxembourg, January 2015 (oral presentation)

French Conferences and Workshops:

- Journées plénières du GDR MicroNanoFluidique, Lyon, avril 2023 (oral presentation)
- Journées de la matière condensée (JMC), Lyon, August 2022 (oral presentation)
- Congrès du Groupe Français de Rhéologie, Bordeaux, October 2021 (short course + oral presentation)
- Journées de la matière condensée (JMC), Rennes, August 2021 (oral presentation)
- Congrès général de la Société Française de Physique, Orsay, July 2017 (oral presentation)
- Réunion de lancement du GDR PHYP, Marseille, June 2017 (oral presentation)
- Journées de la Physique Statistique, Paris, January 2017 et janvier 2013 (mini-oral presentation)
- Journées rhéologie des suspensions denses : du micron au millimètre, Marseille, November 2016 (oral presentation)
- Out-of-Equilibrium Physics, Lyon, June 2013 (poster)

Invited Seminar:

- College of Engineering, Kyung Hee University, online, January 2023
- Bechinger's Group, Universität Konstanz, online, December 2022
- LadHyX (Laboratoire d'Hydrodynamique, École Polytechnique), Palaiseau, January 2019
- Laboratoire de Physique de l'ENS de Lyon, Lyon, November 2018
- LOF – Laboratoire du Futur, Bordeaux, November 2018
- Institut de Physique de Rennes, Rennes, May 2017
- Laboratoire SPEC, Orsay, December 2016
- Institut Lumière Matière, Lyon, November 2016
- Laboratoire IUSTI, Marseille, February 2015

Scientific publications:

[20] M. Lagoin, A. Piednoir, R. Fulcrand, and A. Bérut, "Effects of salinity on the flow of dense colloidal suspensions", *Soft Matter*, vol. 20, pp. 3367–3375, **2024**.

[19] A. Bérut, "Comment on "harvesting information to control nonequilibrium states of active matter"", *Phys. Rev. E*, vol. 107, p. 056601, **2023**.

[18] A. Abdallah, S. Vaidya, S. Hawila, S.-L. Ornis, G. Nebois, A. Barnet, N. Guillou, A. Fateeva, A. Mesbah, G. Ledoux, A. Bérut, L. Vanel, and A. Demessence, "Luminescent and sustainable d10 coinage metal thiolate coordination polymers for high-temperature optical sensing", *iScience*, vol. 26, p. 106016, **2023**.

[17] A. Bérut, O. Pouliquen, and Y. Forterre, "Brownian granular flows down heaps", *Phys. Rev. Lett.*, vol. 123, p. 248005, **2019**.

[16] E. Shabalina, A. Bérut, M. Cavelier, A. Saint-Jalmes, I. Cantat, "Rayleigh-Taylor-like instability in a foam film", *Phys. Rev. Fluids*, vol. 4, pp. 124001, **2019**.

[15] A. Bérut, and I. Cantat, "Marangoni stress induced by rotation frustration in a liquid foam", *Soft Matter*, vol. 15, no. 7, pp. 1562-1570, **2019**.

[14] A. Bérut, H. Chauvet, V. Legué, B. Moulia, O. Pouliquen, and Y. Forterre, "Gravisensors in plant cells behave like an active granular liquid", *Proceedings of the National Academy of Sciences*, vol. 115, no. 20, pp. 5123-5128, **2018**.

[13] M. Yaghoubi, M.E. Foulaadvand, A. Bérut, and J. Łuczka, "Energetics of a driven Brownian harmonic oscillator", *J. Stat. Mech.: Theory and Experiment*, vol. 2017, no.11, p. 113206, **2018**.

[12] O. Pouliquen, Y. Forterre, A. Bérut, H. Chauvet, F. Bizet, V. Legué, and B. Moulia, "A new scenario for gravity detection in plants : the position sensor hypothesis", *Physical Biology*, vol. 14, no. 3, p. 035005, **2017**.

[11] C. Clavaud, A. Bérut, B. Metzger, and Y. Forterre, "Revealing the frictional transition in shear-thickening suspensions", *Proceedings of the National Academy of Sciences*, vol. 114, no. 20, pp. 5147–5152, **2017**.

[10] C. Yolcu, A. Bérut, G. Falasco, A. Petrosyan, S. Ciliberto, and M. Baiesi, "A general fluctuation–response relation for noise variations and its application to driven hydrodynamic experiments", *J. Stat. Phys.*, vol. 167, no. 1, pp. 29–45, **2017**.

[9] A. Bérut, A. Imparato, A. Petrosyan, and S. Ciliberto, "Theoretical description of effective heat transfer between two viscously coupled beads", *Phys. Rev. E*, vol. 94, p. 052148, **2016**.

[8] A. Bérut, A. Imparato, A. Petrosyan, and S. Ciliberto, "The role of coupling on the statistical properties of the energy fluxes between stochastic systems at different temperatures", *J. Stat. Mech. : Theory and Experiment*, vol. 2016, no. 5, p. 054002, **2016**.

[7] A. Bérut, A. Imparato, A. Petrosyan, and S. Ciliberto, "Stationary and transient fluctuation theorems for effective heat fluxes between hydrodynamically coupled particles in optical traps", *Phys. Rev. Lett.*, vol. 116, p. 068301, **2016**.

[6] A. Bérut, A. Petrosyan, J. R. Gomez-Solano, and S. Ciliberto, "Fluctuations in an aging system : the absence of an effective temperature in the sol–gel transition of a quenched gelatin sample", *Journal of Statistical Mechanics : Theory and Experiment*, vol. 2015, no. 10, p. P10020, **2015**.

[5] A. Bérut, A. Petrosyan, and S. Ciliberto, "Information and thermodynamics : experimental verification of landauer's erasure principle", *Journal of Statistical Mechanics : Theory and Experiment*, vol. 2015, no. 6, p. P06015, **2015**.

[4] A. Bérut, A. Petrosyan, and S. Ciliberto, "Energy flow between two hydrodynamically coupled particles kept at different effective temperatures," *EPL*, vol. 107, no. 6, p. 60004, **2014**.

[3] A. Bérut, A. Petrosyan, and S. Ciliberto, "Detailed jarzynski equality applied to a logically irreversible procedure," *EPL*, vol. 103, no. 6, p. 60002, **2013**.

[2] S. Klein, M. Gibert, A. Bérut, and E. Bodenschatz, "Simultaneous 3d measurement of the translation and rotation of finite-size particles and the flow field in a fully developed turbulent water flow", *Measurement Science and Technology*, vol. 24, no. 2, p. 024006, **2013**.

[1] A. Bérut, A. Arakelyan, A. Petrosyan, S. Ciliberto, R. Dillenschneider, and E. Lutz, "Experimental verification of landauer's principle linking information and thermodynamics", *Nature*, vol. 483, no. 7388, pp. 187–189, **2012**.

Other scientific production:

[2] A. Bérut, "A Python script to generate trajectories of Brownian particles, by integrating the overdamped Langevin equation, following Heun's method", aberut/BrownianSimulation1D, GitHub, **2023**.

[1] A. Bérut, "A Python script to compute the 2D pair correlation function (radial distribution function) g(r) for a set of points, corrected to take account of the boundary effects", aberut/ paircorrelation2d, GitHub, **2022**.

Miscellanea:

- **Spoken languages:**
  French (mother tongue),
  English (professional working proficiency),
  Allemand (beginner level).
- **Softwares skills:**
  Scientific softwares (Matlab, Labview),
  Programming languages (Python, Arduino),
  Other softwares (writing with LaTeX, drawing with Inkscape).