

ADRIEN IZZET

Address: ESPCI Paris, CBI MIE
10 rue Vauquelin, 75005 Paris France
Nationality: French
Email: adrien.izzet@gmail.com

EDUCATION

- 2013-2017 **PhD in Physics, Sorbonne University, Paris** (09/01/2013-05/16/2017)
Straddling the jamming transition: non-local rheology and acoustics in dry granular media.
Physics & Mechanics of Heterogeneous Media laboratory, ESPCI Paris, UPMC-CNRS UMR7636, Paris, France. Awarded on 05/16/2017. Advisors: Eric Clément & Bruno Andreotti.
President of PhD jury committee: Pierre-Yves Lagrée.
- 2012-2013 **Master's degree: "Fluid Mechanics: Fundamentals and Applications", Ecole Polytechnique.**
Laboratoire d'Hydrodynamique de l'Ecole Polytechnique (LadHyX), Palaiseau, France, and Institut Jean le Rond d'Alembert (Sorbonne Université, Paris). Awarded on 08/31/2013.
- 2011-2012 **"Agrégation" & Master's degree "Teaching in higher education", École Normale Supérieure de Paris-Saclay.**
Specialization: Mechanics and Engineering Sciences. Awarded on 08/31/2012.
Agrégation is a national competitive examination for teaching in high schools and universities.
- 2009-2013 **École Normale Supérieure, Paris-Saclay** (09/01/2009-08/31/2013)
Double curriculum "Mechatronics": Mechanics, and Applied Physics, Electronics and Robotics.
- 2006-2009 **Higher School Preparatory Classes (CPGE).**
Intensive program in Mathematics, Physics and Engineering Sciences.
CPGE are to prepare the competitive examination to enroll in High Education Schools, such as Écoles Normales Supérieures (ENS). (09/01/2006-08/31/2009)

PROFESSIONAL EXPERIENCE

- 2021-... **Postdoctoral Research Associate (Center for Biology and Innovation, ESPCI Paris, France)**
Team: Innovative Materials for Energy.
Collab.: Annie Colin, Guillaume Ovarlez, Raphael Jeanneret, Jeremie Palacci.
Projects: "Rheology of active biological suspensions" and "Tribology and its effect in the rheology of suspensions".
- 2017-2021 **Postdoctoral Research Associate (Center for Soft Matter Research, NYU)**
Projects: "Dynamics of self-propelled droplets" and "Mechanical properties of adhesive bio-inspired emulsions".
Center for Soft Matter Research, Dep. of Physics at New York University, New York, USA.
Collab.: Jasna Brujic, Eric Vanden-Eijnden, Jérôme Bibette.
Relevant skills: [experimental] bright-field and confocal microscopy (with 3D stack analysis for emulsions), glass capillary fabrication, emulsion chemistry and droplet generation, particle tracking, trajectory analysis, Particle Image Velocimetry (PIV), fluorescence microscopy (monitoring of dissolution patterns), Fluorescence Recovery After Photobleaching (FRAP), Dynamic Light Scattering. [theoretical/numerical] Langevin Dynamics simulations of non-Markovian Random walks.
- 2013-2017 **PhD candidate with Teaching Assistantship (TA: total of 194 hours)**
Relevant skills: [experimental] Acoustic probing of granular samples weakly confined (experiments in Zero-G), Fast-cam imaging (Phantom and Photron cameras), Atomic Force Microscopy (AFM), Computer-Assisted Design (CAD software: Catia and Solidworks), workshop machining and 3D printing. [theoretical/numerical] Numerical resolutions of non-linear problem and coupled ordinary differential equations, Molecular Dynamics simulations (homemade C-code, ran on the cluster at ESPCI), basics in HOOMD-blue.
- 01-06/2012 **Consulting study: Conception of a parametric model for the design of airplane thrust reversers.**
Industrial: ECM-be (<http://ecm-be.fr/uk/>)

Computer Assisted Design (CAD) and Finite Elements Method for parametric stress analysis on an adaptative model of thrust reverser.

06-08/2011 **Seismic study on an asteroid (Near Earth Object): theory and simulations**

Center for Astrodynamic research, University of Colorado in Boulder, USA

Supervisor: Daniel J. Scheeres

Approaches: theoretical and numerical (seismic wave propagation in an asteroid, ejection of a lander).

06-08/2010 **Seismic study on an asteroid (Near Earth Object): experimental study**

Laboratoire de Géophysique Spatiale et Planétaire, Institut de Physique du Globe de Paris

Supervisor: Philippe Lognonné

Approaches: experimental (CAD and electronic design and fabrication of a surface pod for the BASiX NASA discovery Proposal), signal analysis and vibration study of the structure.

PUBLICATIONS IN PEER-REVIEWED JOURNALS

1. **Izzet A**, Moerman P, Gross P, Groenewold J, Hollingsworth AD, Bibette J, Brujic J. *Tunable Persistent Random Walk in Swimming Droplets*. Physical Review X **10** (1-8), 021035 (2020). (DOI:10.1103/PhysRevX.10.021035, **10 citations**).
2. Bouzid M, Trulsson M, **Izzet A**, Coulomb AF, Claudin P, Clément E, Andreotti B. *Non-local rheology of dense granular flows*. Powders & Grains 2017, EPJ Web of Conferences **140**, 11013 (2017). (DOI: 10.1051/epjconf/201714011013, **4 citations**).
3. Bouzid M, **Izzet A**, Trulsson M, Clément E, Claudin P, Andreotti B. *Non-local rheology in dense granular flows*. The European Physical Journal E **38** (11), 125 (2015). (DOI: 10.1140/epje/i2015-15125-1, **102 citations**).

MANUSCRIPTS IN PREPARATION

- Nguyen Le AV, **Izzet A**, Ovarlez G, Colin A. *The unexpected solvent role on the rheological properties of polymeric beads suspension*. [in revision]
- Nagendra K, **Izzet A**, Friedman L, Harrison O, Shapiro L, Honig B, Pontani L-L, Brujic J. *Mechanosensitive response of Cis and Trans E-Cadherin adhesion is history dependent*. [in revision]
- **Izzet A**, Cheng W, Zakine R, Newhall K, Vanden-Eijnden E, Brujic J. *Memory effects in non-Markovian random walks for swimming droplets*.

INVITED SEMINARS

- June 2021: Lab. Seminar. Physicochimie des Electrolytes et Nanosystèmes interfaciaux lab., Sorbonne Univ.
- April 2021: Group seminar, Prof. C. Bechinger, Konstanz University, Germany.
- January 2021: Department seminar. Institut Jean le Rond ∂° ALEMBERT, Sorbonne Univ., Paris.
- November 2019: Research center seminar. Material Research Science and Engineering Centers (NSF-NYU).
- December 2016: Group seminar. Brujic lab., Center for Soft Matter Research, New York University.
- June 2013 : Department seminar. Dep. of Mechatronics, Ecole Normale Supérieure de Rennes, France.

CONFERENCES ORAL CONTRIBUTIONS

- January 2022: Statistical Physics Days, ENS Paris. *The unexpected role of solvent in the rheology of non-Brownian suspensions*.
- October 2021: IPGG Days. *Memory effects in active droplets: an experimental point of view*. March 2021: APS March Meeting. *E-Cadherin-mediated adhesion in the absence of the cytoskeletal machinery*.
- March 2019: APS March Meeting. *Tuning the motility of self-propelled droplets: from persistent to stochastic*.
- June 2018: North-eastern Granular meeting, Yale University. *Activity in active droplets assembly*.
- March 2018: APS March Meeting. *Swimming emulsion droplets*.
- January 2016: Statistical Physics Days, ESPCI Paris. *Acoustics in weakly confined granular media*.
- July 2015: ESPCI Soft Matter Days. *Non-local rheology in granular flows*.
- June 2015: GDR MéPhy. *Non-local rheology in granular avalanches*.
- April 2015: Annual European Rheology Conference. *Non-local rheology in granular avalanches, experimental study*.
- January 2015: Statistical Physics Days, ESPCI Paris. *Acoustics in jammed granular media*.
- August 2014: Condensed Matter Days. *Non-local effects in granular flows*.

CONFERENCE POSTERS

- March 2021: Nagendra K, **Izzet A**, Friedman L, Harrison O, Pontani L-L, Shapiro L, Honig B, Brujic J. *E-cadherin-mediated adhesion in the absence of the cytoskeletal machinery*. Ann. Meeting of the American Physical Society.
- February 2020: Nagendra K, **Izzet A**, Friedman L, Pontani L-L, Harrison O, Shapiro L, Honig B, Brujic J. *E-cadherin-mediated adhesion in the absence of the cytoskeletal machinery*. Annual Meeting of the Biophysical Society.
- June 2015: **Izzet A**, Clément E and Andreotti B. *Non-local rheology for dense granular flows*. ESPCI Soft Matter Days
- December 2010: Robert O, Lognonné P, Scheeres DJ, Goujon N, Le Feuvre M, **Izzet A**, Blitz C, Bowman L. *Seismology on a small body: expected results for the BASiX Mission proposal for NASA Discovery program*. American Geophysical Union, Fall Meeting.

SCHOLARSHIPS AND FUNDINGS

- 2013-2016 Ph.D. funding from the French Ministry of Research and Education.
- 2012-2013 Scholarship from Ecole Polytechnique, France.
- 2009-2013 ENS Scholarship from the French Ministry of Research and Education.

TEACHING EXPERIENCES

- 2014-2016 **Fluid Mechanics**: practical classes for third year bachelor students, Pierre et Marie Curie University - UPMC Paris 6. Total: 63 hours.
- 2014-2015 **Mathematics (Partial Differential Equations, Analytics and Topology)**: tutorial classes for third year bachelor students, Pierre et Marie Curie University - UPMC Paris 6. Total: 16 hours.
- 2014-2015 **Analytical Fluid Mechanics**: tutorials classes for second year bachelor students, Polytech' Paris (prep' classes for the High Education Schools). Total: 20 hours.
- 2013-2015 **General Mechanics**: tutorials for first year bachelor students, Pierre et Marie Curie University - UPMC Paris 6 (2013-2015). Total: 40 hours + 40 hours.
- 2012-2013 **Engineering Sciences and Mechanics**: oral examination of CPGE students (two first years of intensive college classes). Preparatory classes: Louis-le-Grand and Saint Louis high schools, Paris. Total: 38 hours.
- 2012-2013 **Strength of materials**: lecture classes and tutorials for third year bachelor students, Pierre et Marie Curie University - UPMC Paris 6 (2012-2013). Total: 18 hours + 12 hours.

MENTORING OF STUDENTS

- 2021-... **Wenjun Chen – Graduate student, NYU Shanghai**: *Machine Learning for particle trajectory classification*
Co-supervised with Prof. Brujic (NYU).
- 2017-... **Kartikeya Nagendra – Graduate student from NYU Medical School**: *Adhesion interactions in biomimetic emulsions*.
Co-supervised with Prof. Brujic (NYU).
- 03-08/2019 **Leah Friedman – Bachelor student from ENS (France)**: *Protein-protein interactions in biomimetic emulsions*.
Co-supervised with Prof. Brujic & Grad. student K. Nagendra (NYU).
- 06-07/2019 **Preston Gross – N.S.F.-R.E.U. student**: *Packing of swimming droplets*.
Co-supervised with Prof. Brujic (NYU).
- 03-08/2018 **Fanny Delille – Master student from ESPCI (France)**: *Protein-protein interactions in biomimetic emulsions*.
Co-supervision with Prof. Brujic & Grad. student K. Nagendra (NYU).
- 06-07/2018 **Miriam Stein – N.S.F.-R.E.U. student**: *Clustering of active droplets*.
Co-supervised with Prof. Brujic (NYU).
- 06/2017-07/2018 **Ross Flaxman – undergraduate student, research assistant**: *Jamming of attractive emulsions*.
Co-supervised with Prof. Brujic (NYU).
- 2015-2016 **Emilie Marphay – Bachelor student project for High Education Schools entrance examination**:

Flow and jamming of a granular media in a reservoir. Over one year (cumulative time: one week).

03-08/2015 **Darith Hun – Master student:** *Acoustics and packing of a confined granular media*.
Co-supervision with Prof. Clément (ESPCI).

PEER-REVIEW CONTRIBUTIONS for several major international journals: **PRL**, **PRE** and **Soft Matter**.

OUTREACH

- Co-host for the webinar *Hunting the dark universe*, with Neal Weiner (NYU), June 2020.
- Invited scientist for the World Science Festival, 2019 edition, New York.
- Scientific TV show *On n'est pas que des cobayes*. On channel France 5, 2015.
- Radio show *Radio Thésards*. Interviewed by David Christoffel, 2014.

ADMINISTRATIVE ACTIVITIES

2017-2019 Organizer: Materials Research Science and Engineering Center, bi-weekly seminars (NYU).

2014-2016 Representative of PhD students at the lab. administration board, PMMH (ESPCI Paris).

2014-2016 Organizer of the weekly lab. seminars, PMMH (ESPCI Paris).

June 2015 Co-organizer of the “Physique en Ile-de-France” Conference (1st ed., Paris June 23rd, 2015).

This conference gave the opportunity to second-year PhD students in any fields of physics and from the whole Paris area to present their work by giving a talk or presenting a poster.

COMPUTER SKILLS

- Linux, MacOS, Windows.
- Shell and Bash scripts, use of the local cluster of the PMMH lab. (admin. Sylvain Patient, ESPCI Paris) and of the HPC cluster at New York University, USA.
- C, Matlab (also Simulink), Python, Igor Pro.
- Mathematica, Maple, Gnuplot.
- Image processing: Matlab (and Bioformat library), ImageJ (FiJi).
- Labview (basics).
- Adobe Illustrator, Office, LaTeX.
- Finite Elements softwares: freefem++, Gerris, Comsol Multiphysics.
- CAD softwares: Catia, SolidWorks.

TECHNICAL SKILLS

- Rheometer (TA DHR-2)
- Tuning-Fork Microscopy, Atomic Force Microscopy, Scanning Electron Microscopy.
- Image processing, custom PIV and particle tracking, fast-camera imaging (Phantom, Photron), Andor Zyla camera for Nikon Ti-E microscopes (Nikon Elements).
- Langevin Dynamics simulations (homemade Matlab and C codes).
- Molecular Dynamic simulations (homemade C-code and basics on HOOMD-blue code).
- Numerical modelling and resolution of ODEs, PDEs and non-linear equations.
- Acoustics experiments in weightless environment (6 CNES campaigns with the Airbus ZeroG, 310 parabola in weightlessness).
- Technical design, Computer Assisted Design, electronics.
- Manufacturing: use of machine tools (lathe and milling machine), laser cutter, 3D printer.
- Bright field and confocal microscopy.
- Microfluidics, glass capillaries fabrication.
- Dynamic Light Scattering for particle size measurements.
- Interfacial tension measurements.