

Corentin Trégouët

Researcher in soft matter:
mechanics and chemical physics of interfaces



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Scientific experience

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| 2017 - 2019 | Postdoc on the dynamic of the in-drop spinodal decomposition studied through microfluidics , in Twente University. Within the Research Center for Multiscale Catalytic Energy Conversion (MCEC), under the supervision of Dr M. Odijk (BIOS, Twente), Pr A. Van Den Berg (BIOS, Twente), and Pr D. Lohse (PoF, Twente). |
| 2013 - 2016 | PhD on hydrodynamics and interfacial polymer physics: <i>Multilayers of polymers on liquid interfaces: assembly, interfacial rheology and microfluidic probing</i> . Under the supervision of C. Monteux (SIMM, ESPCI) and M. Reyssat (Gulliver, ESPCI). Development of a microfluidic chip to produce capsules and probe their interfacial rheology , coupled with a study and modelization of the dynamics of the polymer on the interface using a pendant drop apparatus. |
| Apr - Jul 2012 | Master thesis : in Princeton University, Mechanical and Aerospace Engineering, Stone group: <i>coupling interaction between an oscillating fiber and a droplet</i> . Supervised by C. Duprat and Pr. H. Stone. |
| Jan - Apr 2011 | Research Team Project : research work with 6 other students: <i>the Epithelial-Mesenchymal-Transition as a phase transition: a statistical physics approach</i> , with Pr. F. Amblard, Institut Curie, Paris. |

Education

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| 2013 - 2016 | PhD of Materials Physics and Chemistry at Université Pierre et Marie Curie, Paris. |
| 2012 - 2013 | Master degree of Material Science at Université Pierre et Marie Curie, Paris. |
| 2009 - 2012 | Bachelor and master degree of engineering at Ecole Polytechnique , Palaiseau: top French engineering university. Major: condensed matter physics; minor: mechanics. |
| 2007 - 2009 | Classes Préparatoires : two years intensive preparation for nationwide competitive examination for entry to engineering universities. |
| 2007 | High school degree (with highest honors). |

Technical and language skills

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| Microfluidic: | soft lithography, PDMS-based, NOA-based, glass-based microfluidic. |
| Rheology: | interfacial rheometer, pendant drop. |
| Microscopy: | confocal microscopy, optical profilometer, mechanical profilometer. |
| Computer skills: | Matlab, LabView, Comsol, SolidWorks, Java, ImageJ, Igor Pro, LaTeX, Illustrator. |
| Languages: | French (native), English (fluent, 99 TOEFL IBT), German (fluent, C1). |

Teaching experience

- 2018 **Teaching assistant** (56 hours)
- bachelor students: tutorials about high-school pre-calculus.
 - bachelor students: practical work about microfabrication and microfluidics.
- 2013 – 2016 **Teaching assistant** (64 hours/year):
- bachelor students: practical work supervision, oral exams and tutoring, about thermodynamics.
 - master students: practical work about characterization of polymer materials for industrial applications (flexion and rupture of polymer materials, adhesion of pressure sensitive adhesives).
- 2011 – 2013 **Private tuitions** (2 hours/week):
- high school and “classes préparatoires” students about physics and mathematics.

Student supervision

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| Undergraduate students | A. Renkowski | (2015, 5 weeks, pendant drop experiments) |
| | S. Kölling | (2018, 10 weeks, high-throughput scalable femtoliter-droplet generator) |
| | D. Schotanus | (2018, 10 weeks, on-chip automated phase-diagram measurement) |
| Master students | S. Poincloux | (2014, 3 months, microfluidic deformation of bubbles) |
| | M. Nomena | (2014, 3 months, microfluidic deformation of capsules) |
| | M. Rump | (2017, 6 months, patterned-surface Ouzo nucleation, cosupervision) |
| | M. Krakkers | (2017-2018, 6 months, on-chip in-situ X-ray diffraction) |

Awarded grants

- 2013-2016 **PhD grant AMX** delivered by the Ecole Polytechnique to the former students according to their marks and their research project. (40/year).
- 2012 **Scholarship for master thesis** awarded by the « Materials Science and Active Surface » program at Ecole Polytechnique, Palaiseau, France (Chaire X-ESPCI-Saint Gobain). ».

Other experiences

- May 2016 **Popular science show E=M6** on national French TV: experiments and explanations of what is catalysis through the example of potassium iodine for hydrogen-peroxide decomposition.
- Aug 2011 **Internship** in the French National Park “Les Ecrins”: maintenance work of hiking trails and counting of endangered species.
- Sept 2009 – Apr 2010 **Military service**: officer in the Corps of Engineers. In charge of the logistic supply for the work on the Aix Island, after the storm Xynthia.

References

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| Detlef Lohse | d.lohse@utwente.nl | +31.53.489.8076 |
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| Mathilde Reyssat | mathilde.reyssat@espci.fr | +33.1.40.79.51.61 |
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| Howard Stone | hastone@princeton.edu | |

Scientific appendix 1: invited talks and seminars

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| Oct 2019 | Internal seminar in Institut de Physique de Rennes (Rennes I). |
| Sept 2019 | Internal seminar in Laboratory of Future (CNRS-Solvay). |
| Sept 2009 | Internal seminar in Institut Lumière Matière (Claude Bernard Lyon II). |
| June 2018 | Internal seminar in LadHyX (Ecole Polytechnique). |
| February 2018 | <i>Microdroplets in high temperature gradients for porous catalytic microbeads.</i> , at the annual meeting of the Max Plank and University of Twente Center for complex fluid dynamics. |
| June 2017 | <i>Multiphasic microfluidic for catalysis</i> , at Kick-off meeting of the Max Plank and University of Twente Center for complex fluid dynamics. |
| May 2016 | <i>Polymer multilayers at liquid interfaces: assembly, interfacial rheology and microfluidic probing</i> , for an internal seminar of Laboratoire de Physique Statistique (Ecole Normal Supérieur de Paris). |
| March 2016 | <i>Multilayers assembly of polymers on liquid interfaces for encapsulation.</i> for an internal seminar of Physics of Fluids group (University of Twente). |

Scientific appendix 2: conferences, workshops, summerschools

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| 2018 | MicroTAS | poster | Kaohsiung, Taiwan |
| 2017 | MicroTAS | poster | Savannah, Georgia, USA |
| 2016 | Complex Motion in Fluids (summer school) | oral | Zenderen, Netherland |
| 2016 | Conference in honor of Liliane Léger | oral | IPGG, Paris, France |
| 2015 | Foam Workshop | oral | ESPCI, Paris France |
| 2015 | Soft Matter Days | oral | CNRS, Gif sur Yvette, France |
| 2015 | Bubble and Drop Interfaces | oral | MPI, Gólm, Germany |
| 2015 | Annual European Rheology Conference | oral | Nantes, France |
| 2014 | Statistical Physics Day | oral | ESPCI, Paris France |
| 2014 | Condense Matter Days | oral | Paris, France |
| 2014 | Emulsion Club | poster | Givaudan, Argenteuil, France |
| 2014 | Dynacaps | poster | UTC, Compiègne, France |
| 2014 | Soft Fire (summer school) | poster | Cargèse, Corse, France |

Scientific appendix 3: publications

1. H. Le The, **C. Tregouet**, M. Kappl, M. Müller, K. Kirchhoff, D. Lohse, A. van den Berg, M. Odijk, J. C. T. Eijkel, Engulfment control of platinum nanoparticles into oxidized silicon substrates for fabrication of dense solid-state nanopore arrays, *Nanotechnology*, **30** (2019)
2. **C. Tregouet**, T. Salez, N. Pantoustier, P. Perrin, M. Reyssat, C. Monteux. Adsorption of monolayers of hydrophobically modified polymers at the air-water interface. *European Physical Journal E*, 41: 101 (2018)
3. **C. Tregouet**, T. Salez, C. Monteux, M. Reyssat. Transient deformation of a droplet near a microfluidic constriction: a quantitative analysis, *Physical review Fluids*, vol 3 no 5 (2018).
4. J. Dupré de Baubigny, **C. Trégouët**, T. Salez, N. Pantoustier, P. Perrin, M. Reyssat, C. Monteux, One-Step Fabrication of pH-Responsive Membranes and Microcapsules through Interfacial H-Bond Polymer Complexation. *Sci. Rep.* **7**, 1265 (2017).
5. **C. Tregouet**. Multilayers of polymers on liquid interfaces: assembly, interfacial rheology and microfluidic probing. (2016) (PhD thesis)
6. S. Le Tirilly, **C. Tregouët**, S. Bône, C. Geffroy, G. Fuller, N. Pantoustier, P. Perrin, C. Monteux. Tuning the anchoring energy and hydrophobic interactions in hydrogen-bonded polymer multilayers assembled at liquid interfaces to control their 2D rheological properties. *Langmuir*, **32** (2016).

7. S. Le Tirilly, **C. Tregouët**, S. Bône, C. Geffroy, G. Fuller, N. Pantoustier, P. Perrin, C. Monteux. Interplay of hydrogen Bonding and Hydrophobic Interactions to Control the Mechanical Properties of Polymer Multilayers at the Oil–Water Interface. *ACS Macro Lett.* **4**, 25–29 (2015).