

Corentin Trégouët



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📅 07/11/1989

Scientific experience

- 2019 - present **Postdoc** on the **dynamic** and **instabilities** of **surface flows** generated by **Marangoni** effects, in the Institut de Physique de Rennes (IPR), Université Rennes 1, under the supervision of Arnaud Saint Jalmes and Isabelle Cantat.
- 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), Prof A. Van Den Berg (BIOS, Twente), and Prof D. Lohse (Physics of Fluids, Twente).
- 2013 - 2016 **PhD** on hydrodynamics and interfacial polymer physics: *Multilayers of polymers on liquid interfaces: assembly, interfacial rheology and microfluidic probing*. Under the supervision of C. Monteux (SIMM, ESPCI-Paris) and M. Reyssat (Gulliver, ESPCI-Paris). 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: *coupling interaction between an oscillating fiber and a droplet*. Supervised by C. Duprat and Pr. H. Stone.
- Jan - Apr 2011 **Research Team Project**: research work with 6 other students: *the Epithelial-Mesenchymal-Transition as a phase transition: a statistical physics approach*, with Pr. F. Amblard, Institut Curie, Paris.

Education

- 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

- 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, Python, LabView, Comsol, SolidWorks, Java, ImageJ, Igor Pro, LaTeX, Illustrator.
- Languages**: French (native), English (fluent, 99 TOEFL IBT), German (fluent, C1), Dutch (intermediate, B1).

Teaching experience

- 2018 **Teaching assistant** (30 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

Undergraduate students	A. Moufidi	(2019, 2 months, imaging of Marangoni flows without tracers)
	D. Schotanus	(2018, 10 weeks, on-chip automated phase-diagram measurement)
	S. Kölling	(2018, 10 weeks, high-throughput scalable femtoliter-droplet generator)
	A. Renkowski	(2015, 5 weeks, pendant drop experiments)
Master students	M. Krakters	(2017-2018, 6 months, on-chip in-situ X-ray diffraction)
	M. Rump	(2017, 6 months, patterned-surface Ouzo nucleation, cosupervision)
	S. Poincloux	(2014, 3 months, microfluidic deformation of bubbles)
	M. Nomena	(2014, 3 months, microfluidic deformation of capsules)

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

- Dec 2016 **Conference to high-school student** about the environment of academic research, soft matter, microfluidics, and encapsulation within the frame of the “Sciences Week”.
- 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

Arnaud Saint Jalmes	arnaud.saint-jalmes@univ-rennes1.fr		
Isabelle Cantat	isabelle.cantat@univ-rennes1.fr	Cecile Monteux	cecile.monteux@espci.fr
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Albert van den Berg	a.vandenberg@utwente.nl	Thomas Salez	thomas.salez@u-bordeaux.fr
Mathieu Odijk	m.odijk@utwente.nl	Howard Stone	hastone@princeton.edu

Scientific appendix 1: invited talks and seminars

October 2018	Internal seminar in Institut de Physique de Rennes (Rennes I).
September 2018	Internal seminar in Laboratory of Future (CNRS-Solvay).
September 2018	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	Internal seminar in Laboratoire de Physique Statistique (Ecole Normal Supérieur de Paris).
March 2016	Internal seminar in Physics of Fluids group (University of Twente).

Scientific appendix 2: conferences, workshops, summerschools

2019	MicroTAS	poster	Basel, Switzerland
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. M. Pepicelli, N. Jaensson, **C. Tregouët**, B. Schroyen, A. Aliche, T. Tervoort, C. Monteux, J. Vermant, Surface viscoelasticity in model polymer multilayers: From planar interfaces to rising bubbles. *Journal of Rheology*. 63(5), pp 815–28 (2019).
2. **C. Tregouët**, T. Salez, N. Pantoustier, P. Perrin, M. Reyssat, C. Monteux. Probing the adsorption/desorption of amphiphilic polymers at the air–water interface during large interfacial deformations. *Soft Matter*, 41: 101 (2019)
3. **C. Tregouët**, T. Salez, C. Monteux, M. Reyssat. Microfluidic probing of the complex interfacial rheology of multilayer capsules. *Soft Matter* (2019)
4. G. Geitenbeek, J.C. Vollenbroek, H.M.H. Weijgertze, **C.B.M. Tregouët**, A.-E. Nieuwelink, C. Kennedy, B.M. Weckhuysen, D. Lohse, A. van Bladeren, A. van den Berg, M. Odijk, A. Meijerink, Luminescence Thermometry for In Situ Temperature Measurements in Microfluidic Devices. *Lab on Chip*, (2019)
5. H. Le The, **C. Tregouët**, 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)
6. **C. Tregouët**, 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)
7. **C. Tregouët**, 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).

8. 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).
9. **C. Tregouet**. Multilayers of polymers on liquid interfaces: assembly, interfacial rheology and microfluidic probing. (2016) (PhD thesis)
10. 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).
11. 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).

Conference proceedings:

12. **C. Tregouet**, M. Odijk, D. Lohse, and A. van den Berg, Microdroplets in high temperature gradients generating porous catalytic microbeads, *22nd International Conference on Miniaturized Systems for Chemistry and Life Sciences 2018 (MicroTAS 2018)*
13. **C. Tregouet**, H. Le The, M. Odijk, J. Snoeijer, J. Eijkel, D. Lohse, and A. van den Berg, Diffusiophoresis of gold in silica driven by the nanometric interfacial layer, *21st International Conference on Miniaturized Systems for Chemistry and Life Sciences 2017 (MicroTAS 2017)*