

Graduate Student Opportunities in Complex Fluids Research at Université Laval: Join a Competitive and Innovative Team

The Laboratory of Complex Fluids Research (LCFR) at Université Laval (Canada) is seeking highly motivated candidates for graduate student positions (PhD and MSc) to participate in exciting and innovative projects in the highly competitive and rapidly evolving research area of complex flows. Led by Professor S.M. Taghavi, holder of the prestigious Canada Research Chair in Modeling Complex Flows, our laboratory is committed to advancing our understanding of interfacial flows of complex fluids. As such, we are seeking talented students with a strong background in fluid mechanics to join our team.

Priority will be given to students from Latin America, and we strongly encourage interested candidates to apply. We are dedicated to supporting Latin American students in obtaining scholarships from their home countries and to helping them prepare the required scholarship application documents.

Our projects require a multifaceted approach, which includes experimental, computational, and theoretical investigations of interfacial flows of complex fluids, with a particular focus on complex yield stress materials at moderate or high Reynolds numbers. We are interested in studying various types of instabilities that arise in these flows. The selected students will have the opportunity to design and build advanced experimental setups, and will gain expertise in ultra-high-speed imaging (beyond 1 million frames per second), advanced image analysis using machine learning and artificial intelligence, laser imaging (such as time-resolved tomographic particle image velocimetry (tomo-PIV), laser-induced fluorescence (LIF), and ultrasound Doppler velocimetry (UDV)), and advanced rheometry techniques. Additionally, students will be trained to perform high-resolution OpenFOAM simulations using parallel processing methods on Compute Canada clusters. They will also develop advanced semi-analytical models, drawing on fluid mechanics and complex (yield stress) flows, to predict interfacial behaviors, and will compare the model results with those of experiments and computations. These models will be transformed into industrial software. Students will also have the opportunity to supervise undergraduate and summer interns and engage in cutting-edge research. Furthermore, we will encourage our students to interact with industry and participate in internships at Canadian companies and/or international research institutes (e.g., in Germany or Norway) during the course of their research.

Université Laval, the oldest center of higher education in Canada, is located in Québec city, the capital city of the province of Quebec (<https://www.quebec-cite.com/en>). While the cost of living is relatively affordable, the city boasts some of the highest standards of living in Canada. Although our graduate programs are in English, we welcome students to learn French if they wish to do so.

Applicants must hold a degree in Mechanical Engineering, Chemical Engineering, Material Engineering, or Engineering Physics, with a strong background in fluid mechanics and preferably some knowledge of non-Newtonian fluids and rheology. If you are interested in applying, please submit a cover letter, a complete CV, and the names of three references to Professor S.M. Taghavi at:

Seyed-Mohammad.Taghavi@gch.ulaval.ca

For further information on our research, please visit our website: <https://www.gch.ulaval.ca/smtag/> or refer to the following recent papers for an idea of our research scope:

- S. Akbari and S.M. Taghavi. "From breakup to coiling and buckling regimes in buoyant viscoplastic injections, 940, A42, 2022.
- S. Noroozi, W. Arne, R.G. Larson, and S.M. Taghavi. "Centrifugal spinning of viscoelastic nanofibres". Journal of Fluid Mechanics, 934, A9, 2022.