

Microplastics | A big mini-problem

January 1, 2023



It is a scourge barely visible to the naked eye. Through the lens of a microscope, our photographer captured fragments of a miniature world of pollution. Zoom on microplastics in the St. Lawrence River.

Posted at 5:00 a.m.

(Quebec) Tuân Anh Tô is a detective. A detective of the infinitely small.

In the darkness of the microscope room of the National Institute for Scientific Research (INRS), he meticulously auscultates the contents of a Petri dish. Equipped with dissecting forceps, he delicately lifts a tiny whitish sphere covered in sediment and places it under the magnifying glass of a microscope.

“It looks like the planet of the Little Prince,” he says, staring at the photo that has just been captured through the lens by the lens of *The Press*.

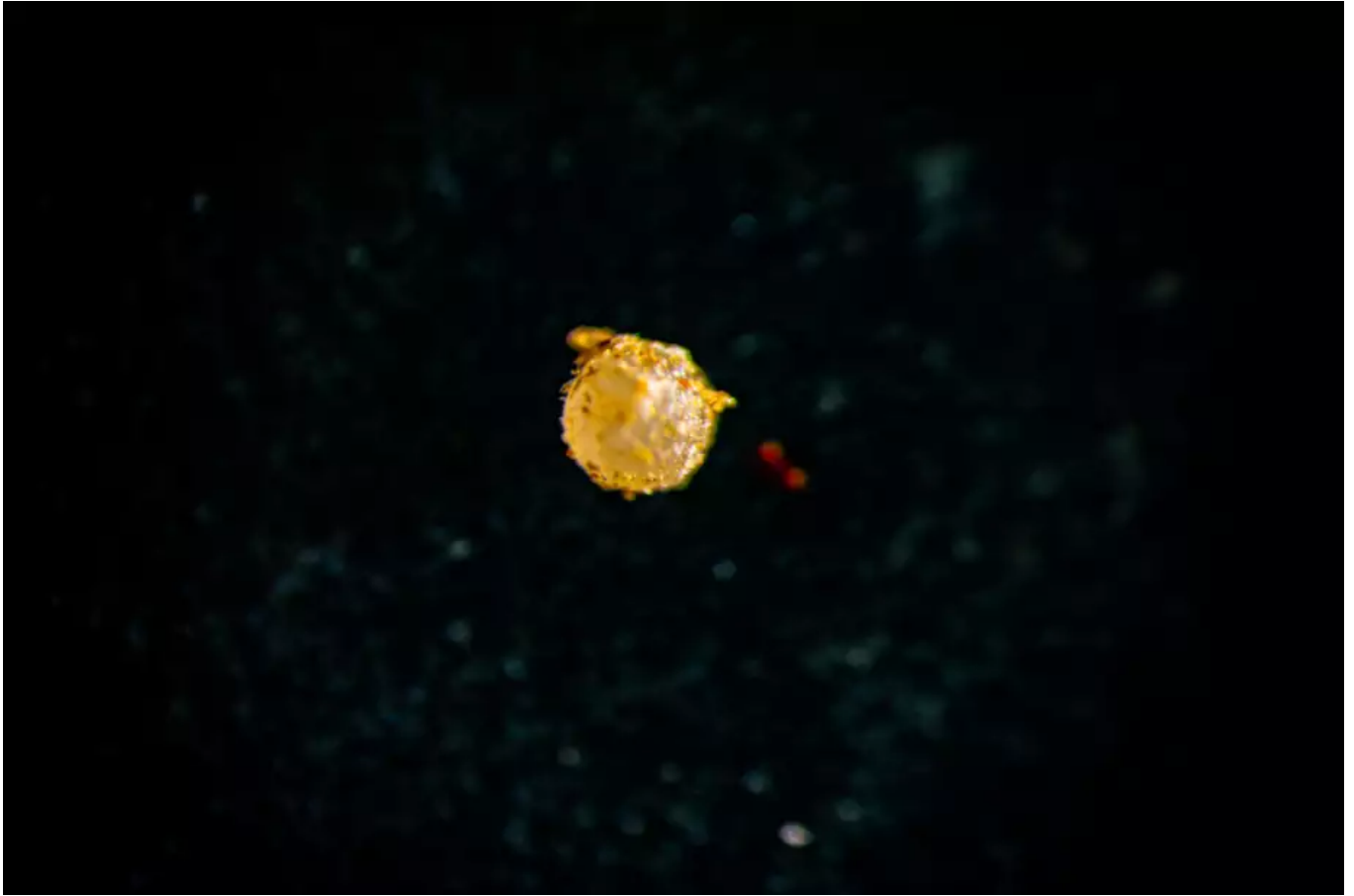


PHOTO MARTIN TREMBLAY, THE PRESS

A polystyrene microbead covered with sediment

This miniature globe is a microbead. It was fished out of the St. Lawrence River near Trois-Rivières as part of a research project on microplastics.

Microplastics are particles ranging in size from 0.1 micrometer (μm) to 5 millimeters (mm).

These can be microbeads used until recently as abrasives in personal care products like toothpaste, fibers that come from textiles like polyester, or “fragments” from plastic products that have degraded. .



PHOTO MARTIN TREMBLAY, THE PRESS

A fragment of microplastic. According to the analysis of the molecular composition of the plastic, it is polypropylene. This kind of plastic is very popular in the food packaging industry.

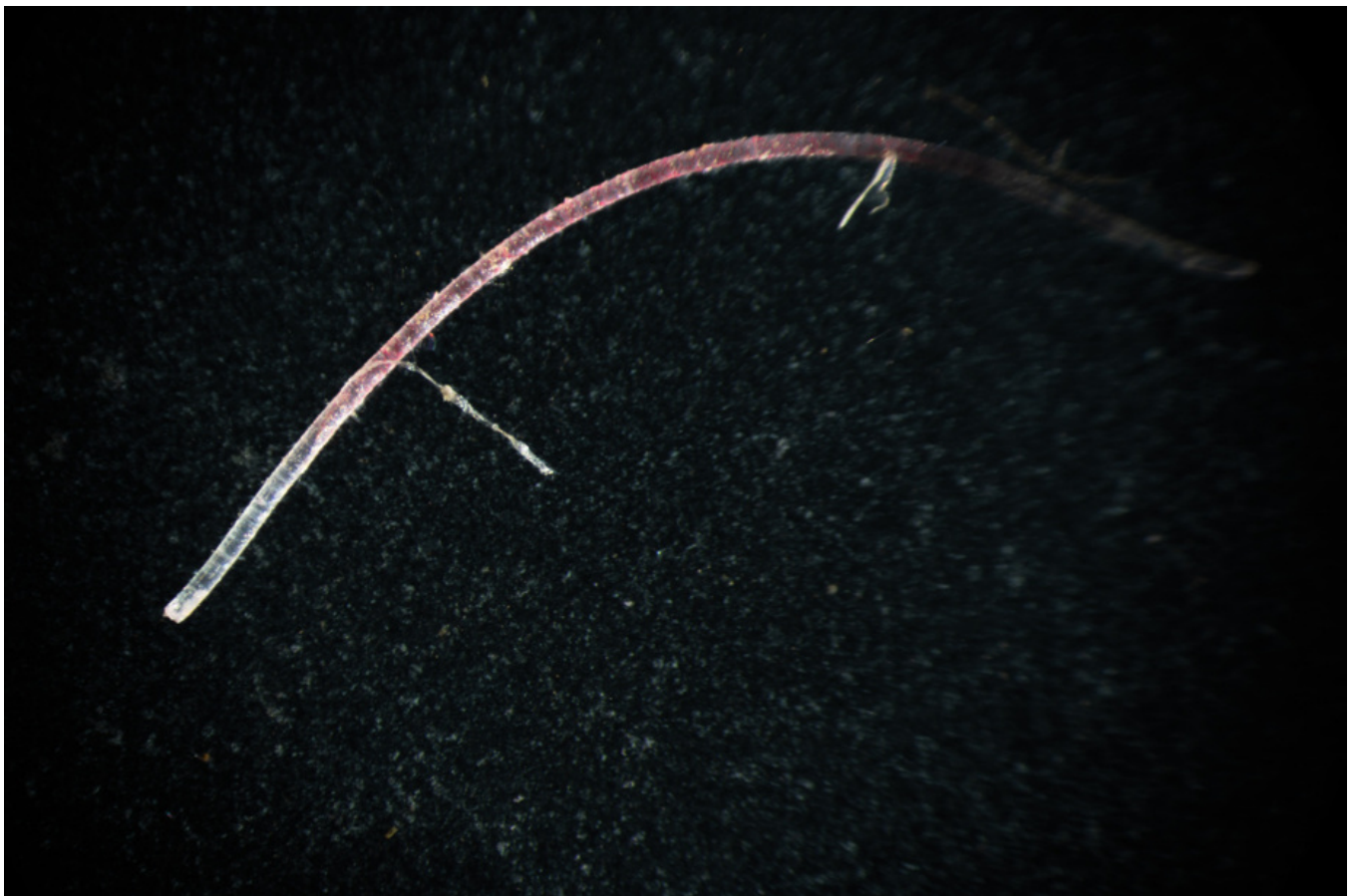


PHOTO MARTIN TREMBLAY, THE PRESS

A polypropylene fiber. Polypropylene is also often used in the composition of carpets, ropes and geotextiles.

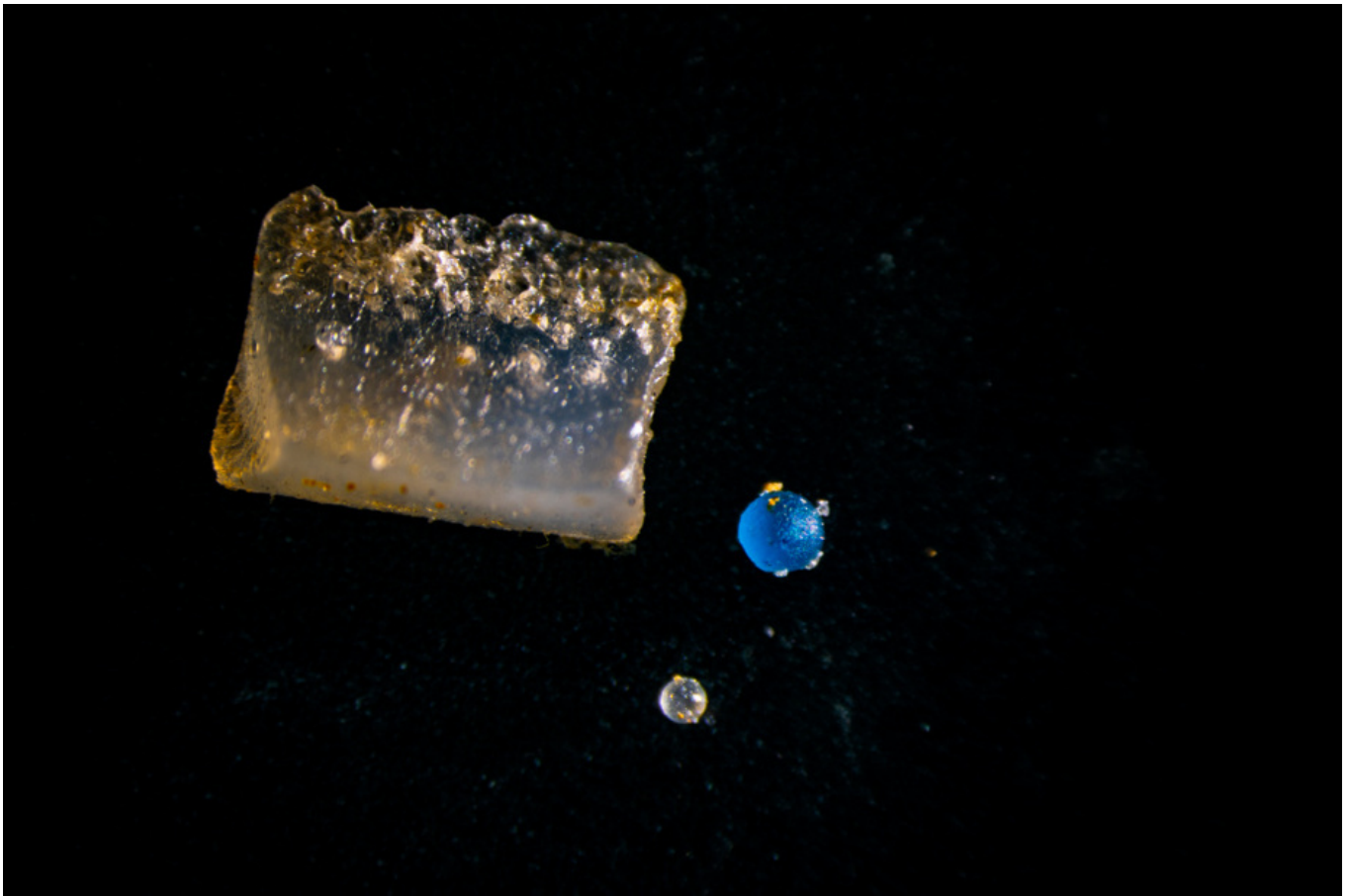


PHOTO MARTIN TREMBLAY, THE PRESS

A fragment of microplastic and two microbeads

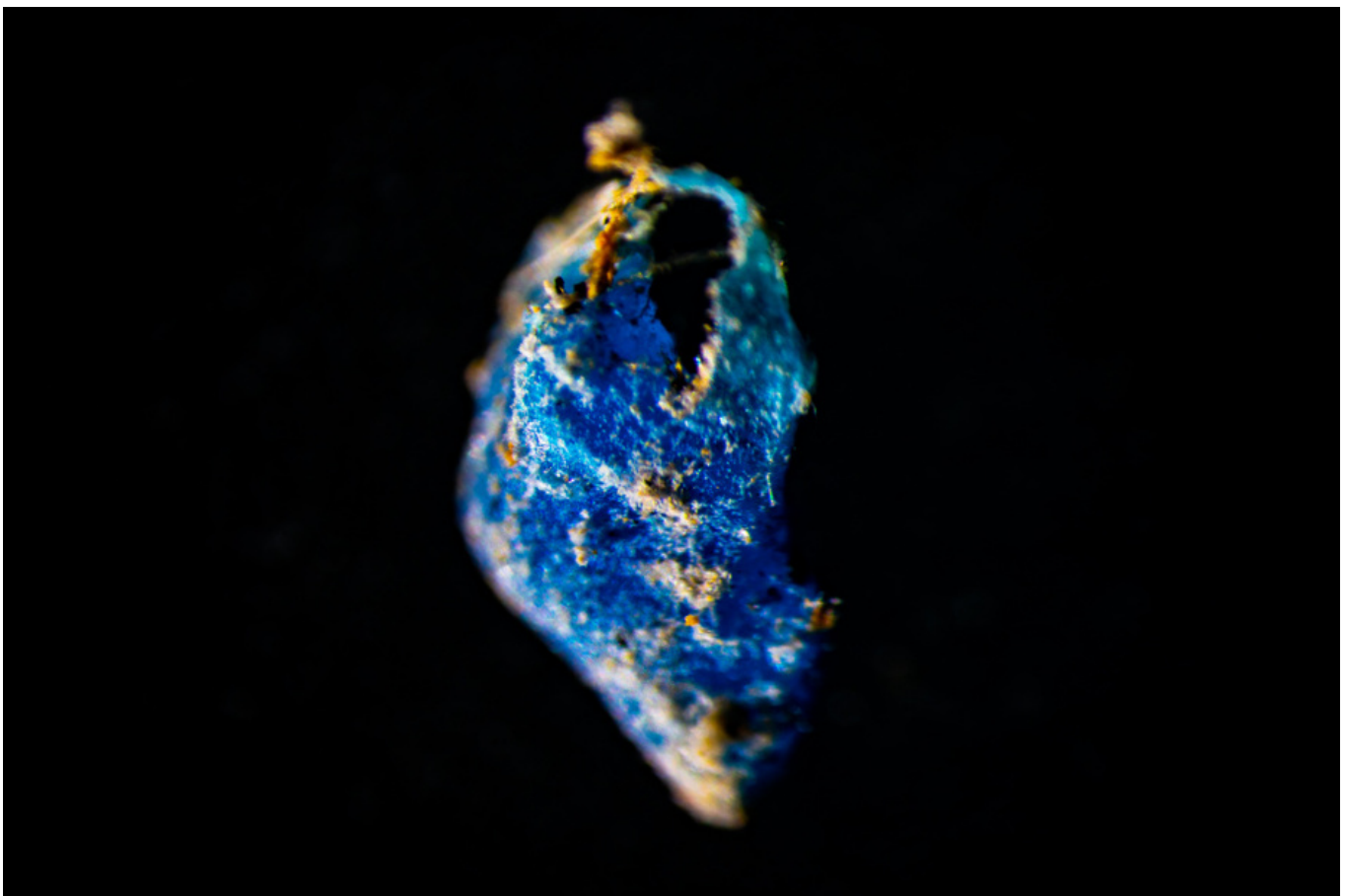


PHOTO MARTIN TREMBLAY, THE PRESS

A piece of polystyrene, commonly known as styrofoam

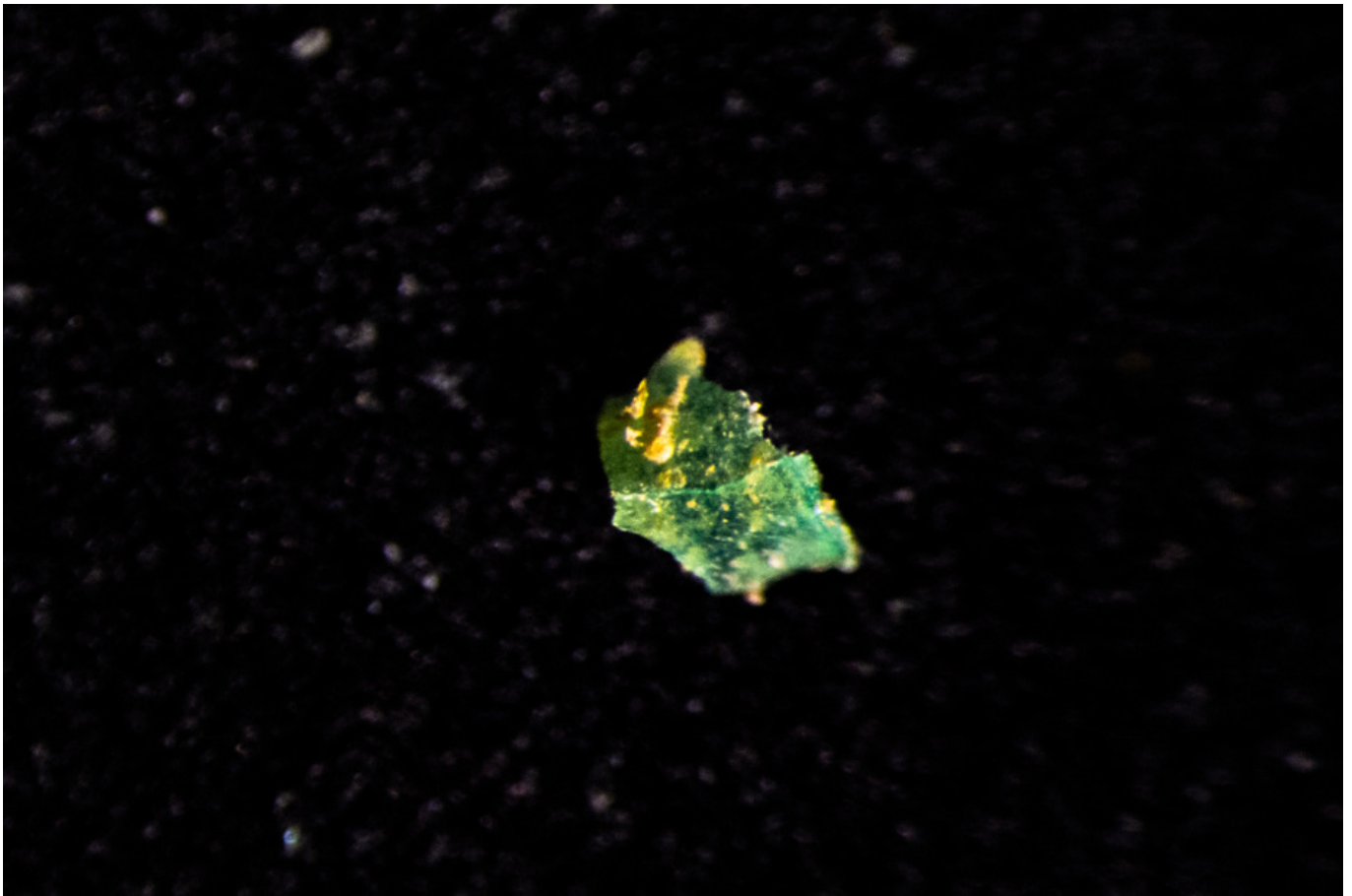


PHOTO MARTIN TREMBLAY, THE PRESS

A fragment of polyethylene. Polyethylene is the most traded plastic in the world.



PHOTO MARTIN TREMBLAY, THE PRESS

A piece of microplastic

Tuấn Anh Tô and his colleagues spent countless hours individually isolating and classifying the microplastics collected from the river in 2021. Then, they analyzed the molecular composition of each particle. A real monk's work.

Each piece is unique, like a snowflake. Through a microscope with a potential for magnification up to 1000 times, the specimens resemble objects floating in the cosmos. A disturbing beauty.

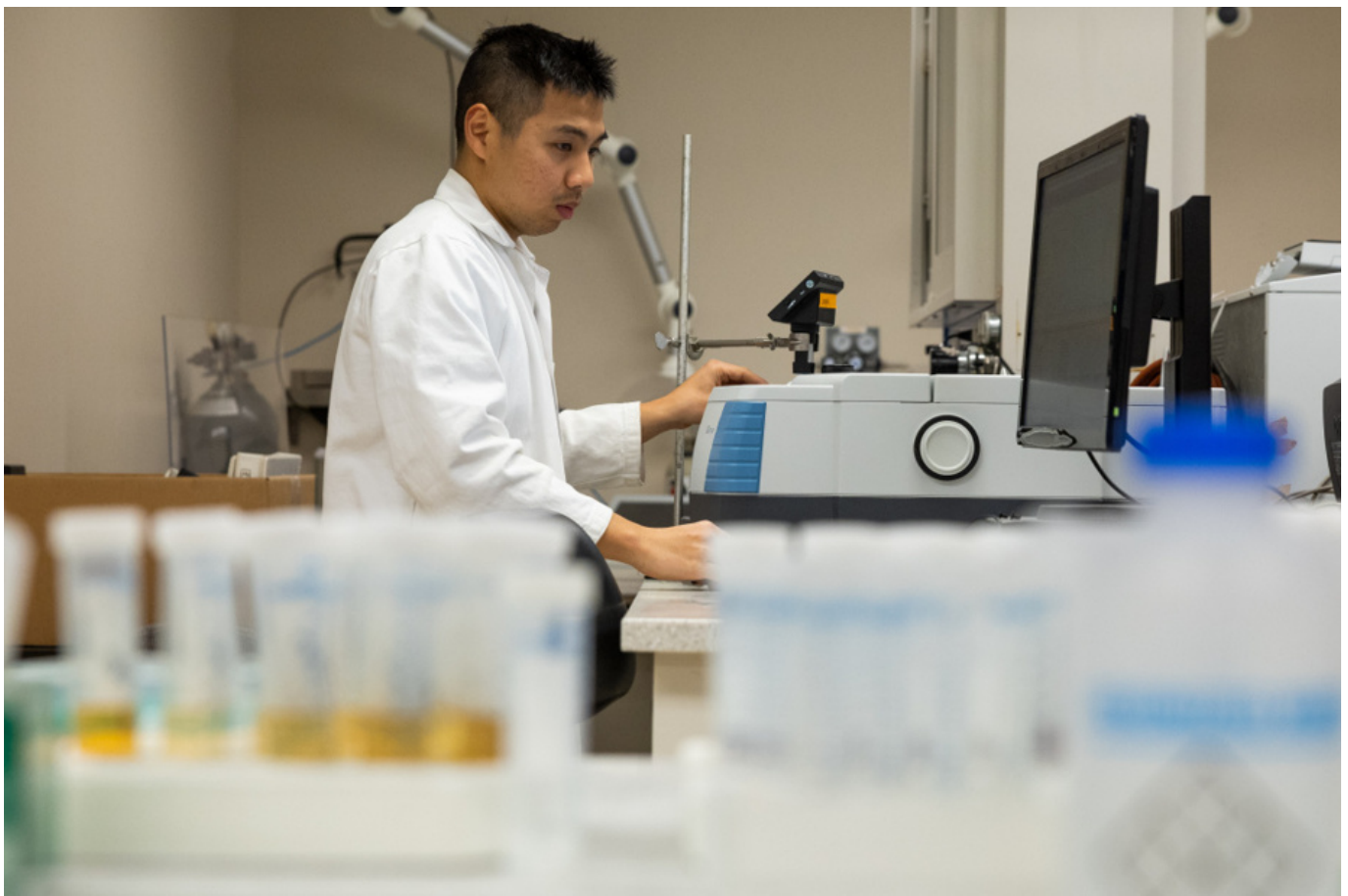


PHOTO MARTIN TREMBLAY, THE PRESS

Technician Tuấn Anh Tô at work in the INRS premises. The pieces of microplastics are taken one by one and deposited in this device called FTIR in order to precisely determine the molecular composition of the plastic.



PHOTO MARTIN TREMBLAY, THE PRESS

Countless hours have been spent isolating one by one and classifying the collected microplastics.

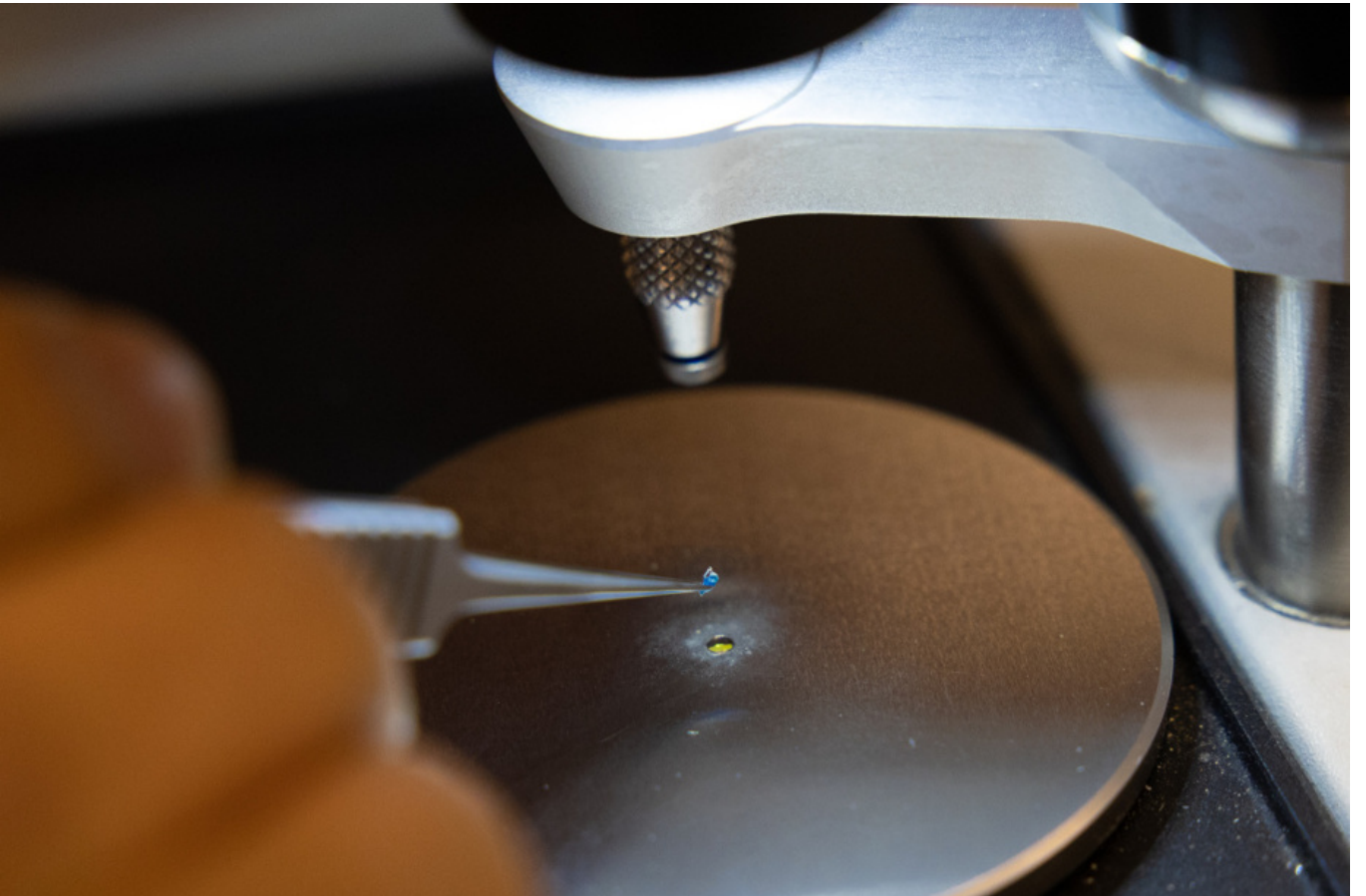


PHOTO MARTIN TREMBLAY, THE PRESS

A real monk's work...

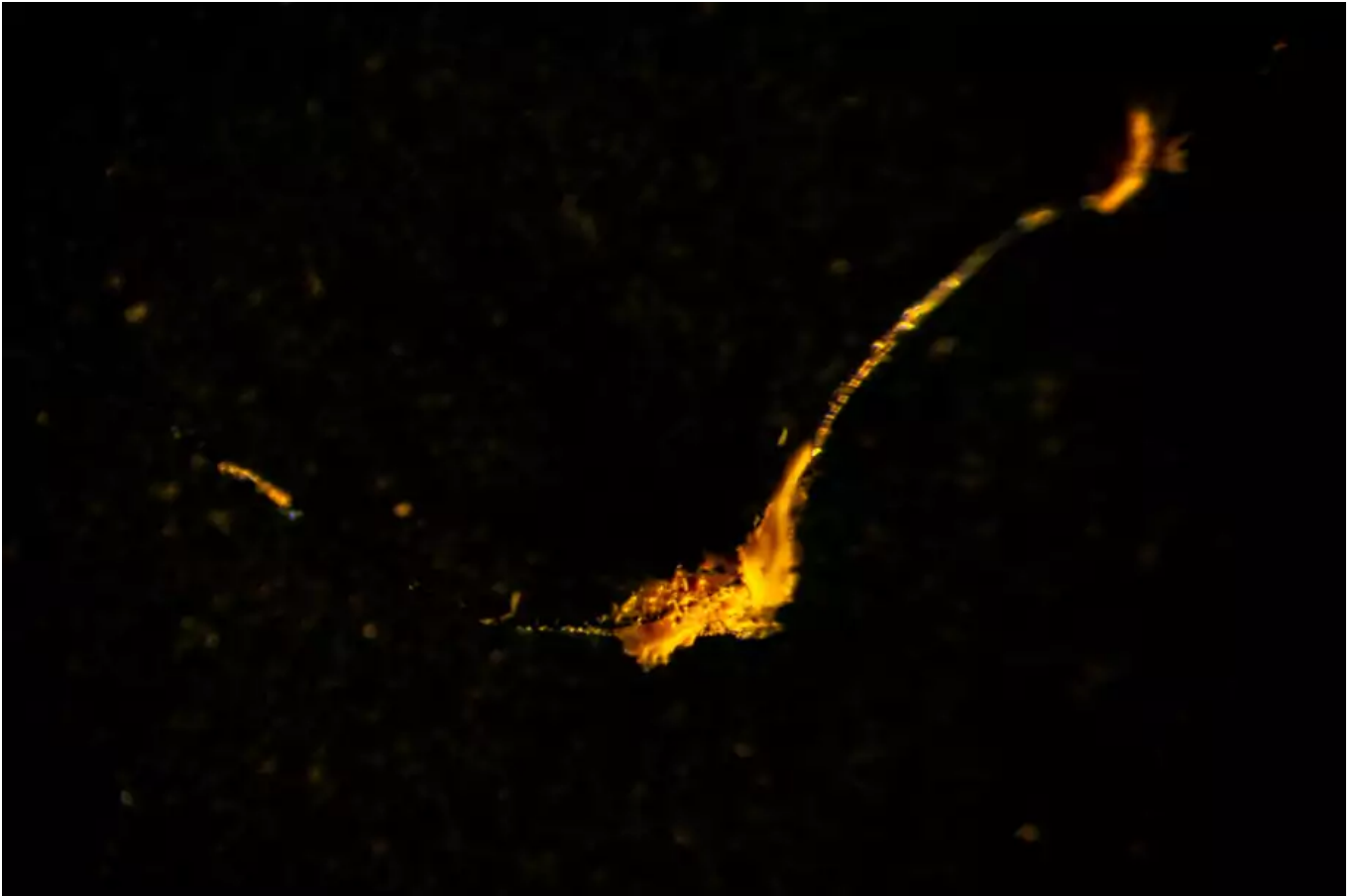


PHOTO MARTIN TREMBLAY, THE PRESS

A synthetic textile fiber (or microplastic)

“We found microplastics at all the sampling stations,” summarizes the researcher who holds the Canada Research Chair in Ecotoxicogenomics and Endocrine Disruption.

At each station, six samples were collected in a layer 50 centimeters from the surface. For each 1 liter sample collected, 200,000 to 300,000 liters of water were filtered.

Result after analysis of the 66 samples: all contained from a few to hundreds of microplastic particles.

“There was really a lot of fiber, it surprised us,” she says.

The fibers come from synthetic textiles made from petroleum-derived materials like spandex, polyester or nylon that have been leached through sewage.

“Maybe we found more fibers because it’s very light. It may have a greater buoyancy property than other microplastics. »



PHOTO MARTIN TREMBLAY, THE PRESS

Valérie Langlois, researcher holding the Canada Research Chair in Ecotoxicogenomics and Endocrine Disruption

Fibers, when you think about it: we wash our laundry every day, everyone, all the time.

Valérie Langlois, researcher holding the Canada Research Chair in Ecotoxicogenomics and Endocrine Disruption

Microplastics can further degrade and become nanoplastics.

Nanoplastics measure from 0.001 to 0.1 μm . They are therefore pieces smaller than a thousandth of a millimeter.

“Science, for microplastics, has reached the point that we have found them, that we have tried to find harmful effects on health and that we do not yet clearly find any,” explains Professor Langlois. . “Nanoplastics most likely have health impacts because they enter cells. »

Ambassadors

Their characterization work is now complete, but we will have to wait to find out at the height of which city, in the river, the concentrations of microplastics were the highest. The results of this large experiment are expected to be submitted for scholarly review in 2023.



PHOTO MARTIN TREMBLAY, THE PRESS

Polyethylene fragment

The research project was launched by the non-profit organization Strategies Saint-Laurent. The project aimed to test the effectiveness of a net invented by the young shoot Quebec Poly-Mer. "The goal is to put it behind a kayak or a canoe. People, while doing their sporting activities, could, for that matter, remove the microplastics," explains Professor Langlois.

When she was contacted, Valérie Langlois said she was seduced by the potential of this type of approach.

"Is it really going to wash away the water as Robert Charlebois sang? Maybe not a lot. But the idea is all positive. When we talk about what citizens can do, to have such a net, everyone will ask you: "Why do you have a net like that? What is a microplastic? In this way, they become spokespersons for the popularization of science on the issue. »



PHOTO MARTIN TREMBLAY, THE PRESS

The St. Lawrence River near Varennes

The St. Lawrence, one of the worst rivers studied

The St. Lawrence River rivals the most microplastic-polluted rivers on the planet. In 2014, a team of scientists from McGill University became interested in the presence of polyethylene microbeads of less than 2 mm in the sediments of the river in a stretch of fresh water of 320 kilometers between Lake Saint-François and Quebec City. The highest density observed on a single site was of a magnitude comparable to those of the most contaminated ocean floors on the planet. Scientists – again from McGill University – then looked at all types of microplastics, this time in the sediments and surface water of the river. According to results published in the journal *Environmental Pollution* in May 2020, the average concentration of microplastics in the sediments and surface water of the St. Lawrence River would be of the same magnitude as those measured near the most populated cities in China.

Learn more

- **10 millions**

A study published in early November in *NatureCommunications* found that blue whales living off the coast of California ingest up to 10 million pieces of microplastic per day.

Source: Agence France-Presse

2018

In July 2018, the Government of Canada banned the manufacture and import of microbeads in toiletries such as skin cleansers and toothpaste. However, microbeads used in industrial processes are excluded.

Source: Government of Canada