

## **Visiting the Great Lakes Institute for Environmental Research (GLIER) and Freshwater Restoration Ecology Centre (FREC) with Dr. Trevor Pitcher**

---- Reciprocal Learning Program (RLP) team and sister school visitors from Toronto  
参观世界科学技术最前沿:著名的加拿大五大湖环境研究所和淡水恢复生态中心

**Time:** 9:40am-14:20pm, Dec 11<sup>th</sup>, 2017

时间: 2017 年 12 月 11 日

**Host:** Dr. Trevor Pitcher, GLIER Executive Director (acting) and FREC Director

研究中心负责人 Trevor Pitcher 教授

**Visitors:** Dr. Shijing Xu, SSHRC Partnership Grant Project Director, Faculty of Education/University of Windsor; Yuhan Deng & Fang Lin, Dr. Xu's graduate assistants; Ms. Adrienne Rigler from Toronto sister school; Yishin Khoo, graduate research assistant with Dr. Michael Connelly at University of Toronto; and Ms. Xiaohong Li, a visiting scholar from Guangxi University, and her 10-year old son.

参观人员: 温莎大学教育学院中加互惠学习项目负责人许世静教授以其研究生助理林芳, 邓雨涵, 多伦多姊妹校老师 Adrienne Rigler, 多伦多大学康纳利教授的研究生助理邱亦欣, 中国访问学者李老師。



Ms. Rigler has been collaborating with Shanghai sister school science teachers on water projects through Drs. Xu and Connelly's Canada-China reciprocal learning sister school project. Under an arrangement made by Drs. Xu and Connelly with Dr. Pitcher, we had a great visit with Dr. Trevor Pitcher who warmly welcomed all of us to GLIER.

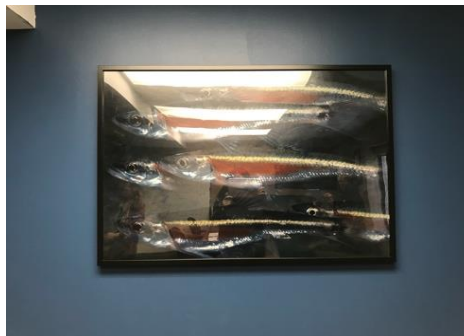
At 10 am, Dr. Pitcher met with us at the lounge of GLIER. Dr. Pitcher is the acting director of GLIER. Dr. Xu introduced the guests to Dr. Pitcher; Dr. Pitcher greeted all of us warmly.

在中加互惠学习项目负责人许世静教授和康纳利教授的安排下, 多伦多姊妹校团队来到温莎参观温莎大学的水资源和环境研究项目。负责人 Dr. Trevor Pitcher 教授热情欢迎了我们。



Dr. Pitcher introduced that GLIER was established in the 1980s and it focuses on three main areas: water quality, invasive species, and biodiversity. There are 9 faculty members at the center. One of the highlights is that the Institute partners with different sectors, for example, with business, hospitals, and social science departments.

Dr. Pitcher 教授介绍了研究所的基本情况和 9 名科学家的科研方向。他指出目前研究所主要研究水资源，物种入侵和生物多样性这三个领域。同时，他们也很重视和其他领域的合作。

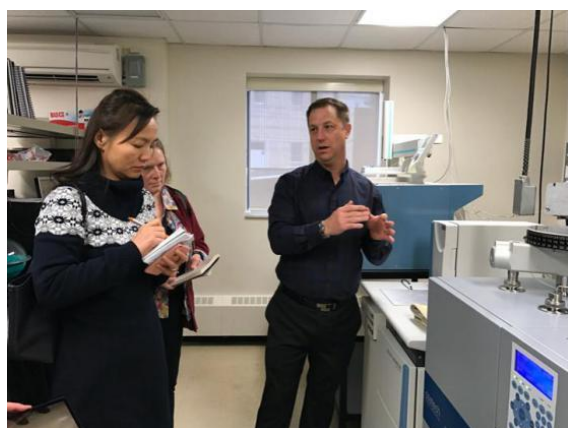


On our way to the first lab, we stopped by a poster that introduced Dr. Pitcher's lab and research. Then, a painting with several fish-images on the wall in Dr. Pitcher's office caught our eyes. We learned from Dr. Pitcher, that those are red side dace fish. This kind of fish is an endangered species in Canada. It can only be found where high population tributaries flow into the Lake Ontario. The fish is being endangered by salt, metal, and chemicals that are flowing into the river. Dr. Pitcher has been working on restoring the ecology of red side dace, and also collaborating with different stakeholders such as schools and the Toronto zoo to raise public awareness. Dr. Pitcher also showed us an article published in Nature, which demonstrated the findings from a French scientist who had used the first-class facility and equipment in GLIER to analyze one of the oldest fish fossils on earth.

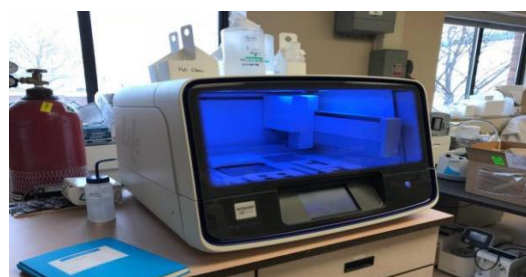
Dr. Pitcher 教授先向我们介绍走廊里展示所有在这里工作的教授的研究的简报，其中我们看到了他本人的鱼类生态研究，还有他办公室墙上的这幅色彩斑斓的鱼的图片。



这种只生活在加拿大安省境内的鱼叫红斑鱼，目前已经是一种濒危鱼类。Pitcher 教授一直致力于保护和改善其生态环境的活动和研究中。他还向我们介绍了一篇发表在《自然》上的研究报告，是一位来自法国的科学家到 GLIER 用其高端的设备来检测分析世界上最古老的鱼化石。



Next, Dr. Pitcher led us to visit six research labs which equipped with advanced facility and first-class lab equipment. He told us about various research activities in the research center. The six labs that we visited were the Genetics Lab, Water Quality Lab, Chemical Tracers Lab, Isotope Lab, SEM (scanning electron microscope) Lab, and the Environmental Genomics Lab. Dr. Pitcher told us that there are 42 labs in the center. It would take us two days or two weeks to see all these labs where scientists and their graduate students and assistants conduct cutting-edge research.



接下来，他带大家参观了研究所里的 6 个重点实验室。该研究所有 42 个实验室，拥有世界最顶尖的科学设备和仪器。科学家和他们的研究生在这里从事基因、水资源和生物，乃至整个生态环境恢复和保护的系统研究和工程。

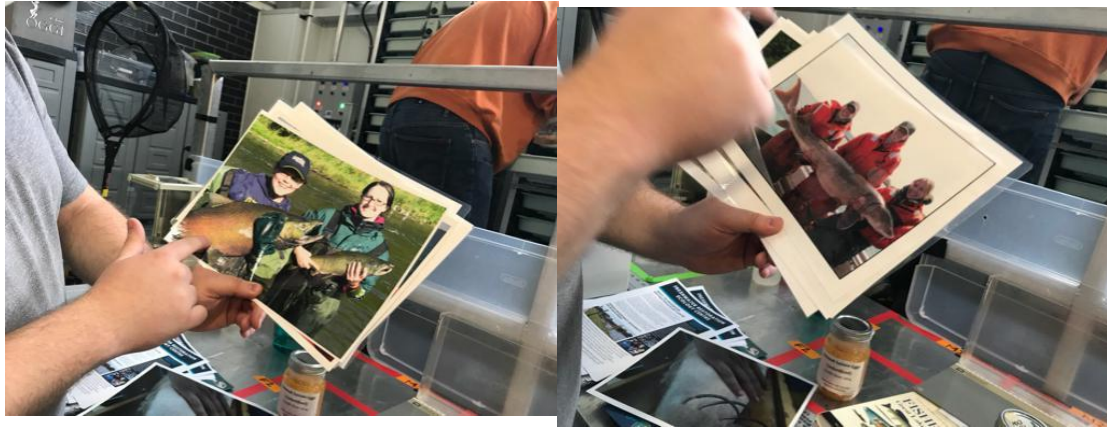


After touring the GLIER, we went to Dr. Pitcher's Freshwater Restoration Ecology Center (FREC) in LaSalle. Dr. Pitcher's graduate students showed us various trays they had been using for hatching salmon and other fishes, such as the Lake Sturgeons. Dr. Pitcher said that at FREC, one can find an integration of science, computer science, ecology, engineering, design and math. He had asked students from engineering and computer science departments to help design some of the equipment in FREC. Through this way, FREC is able to promote inter-sectoral and interdisciplinary collaborations to solve environmental problems.

结束了对五大湖环境研究所的参观后，我们来到了 Pitcher 教授建立的淡水恢复生态中心。Pitcher 教授研究生团队给我们展示了正在孵化的三文鱼鱼卵。他表示淡水恢复生态中心对促进自然科学，计算机科学，工程学，生态学和数学等学科之间关于环境问题的合作有着突出的贡献。







After lunch, under Dr. Pitcher's lead, we toured around the main lab space at FREC. He showed us a picture of three people carrying a big fish. The fish is more than 100 years old. His team has found ways to analyze the contaminants that the fish has lived with in the water over the past 100 years.

吃过午饭，Pitcher 教授向我们展示了一些研究照片。Dr. Pitcher 给我们看了一幅三个成人才能抱住的大鱼照片，照片里的鱼已经有 100 岁了。通过五大湖研究所的先进设备科学家们可以检测出这一百年里这条大鱼经历的每一年的水质变化和这条鱼生活过的生态环境的变迁。



Dr. Pitcher also showed us some of the teaching materials he had created for an educational program that introduces the life stages of Atlantic salmons. Every week, Dr. Pitcher would visit a school or school children would come to FREC to learn about the life stages of Atlantic Salmons. Dr. Pitcher said that he would show samples of salmon eggs to the children whenever they visit. Children also have a chance to pick the fish eggs and put them into tubes and made them into souvenirs to bring home. Dr. Pitcher told us that a boy still kept this special gift obtained from Dr. Pitcher from 10 years ago. Dr. Xu said that some of the sister schools she was working with in Windsor were doing science projects and she was interested in making a connection between sister schools and Dr. Pitcher's research center.

Pitcher 教授向我们展示了一些教学教具。他每周都会到不同的学校做讲座。他带去的用于教学的鱼卵样本受到同学们的喜爱，有时他也会送一些小的样本给学生们，他们纷纷爱不释手。许教授表示有兴趣让更多姊妹校的学生可以到研究中心学习。



Dr. Pitcher showed us an equipment his team had been using to catch fishes in the river. He said that this particular equipment had drawn lots of curiosity from students. Students like to put the equipment on and take pictures with it. Dr. Xu had a try, and she said it was a little heavy even without the battery on. The scientists would have to carry it and walk in the river.

Pitcher 教授向我们展示了捕鱼研究用具。在过去的教学过程中，所有的同学都对这个设备充满好奇，学生们都亲自想要尝试。许教授尝试了一下，发现这个装置即使没安电池也挺重的。







Dr. Pitcher introduced the water purification system of FREC. He also showed us an experimental equipment that has been designed by some University of Windsor graduate students to test how different qualities of water could influence the habit of the fish (see picture on the top left corner of this page)

Pitcher 教授向我们介绍了中心的水净化系统和实验装置, 尤其是如左图所示由他的研究生设计的检测水质的仪器。在这里, 不同学科的研究团队可以一起合作, 设计不同的实验, 但最终目的都是为了更好地保护自然和生态环境。



At the end of the visit, we had an unforgettable experience of touching the baby sturgeons in FREC. The baby sturgeons were placed in two different water tanks, one was filled with the river water, and the other was filled with pure water. The research team will track and observe them after three months. After the fishes have grown old enough, they will be put back into the Detroit river.

在最后, 大家还兴奋地仔细观察了珍贵的鲟鱼苗。这些鱼苗分别培育在净化水和河水两个实验鱼缸里, 研究团队将会待它们成年后投放回底特律河中, 继续跟踪它们在河里生存的情况。



The scenery outside the FREC was really a feast for the eyes! It is so peaceful and beautiful with a large flock of white swans swimming on the river. Such a beautiful scenery reminds us of the importance to protect our environment, and as an educator, we are responsible for educating the younger generations about this responsibility! We appreciate this great learning opportunity and look forward to visiting Dr. Pitcher's Freshwater Restoration Ecology Center (FREC) again with our sister school children in Spring!

研究中心外的河面上一群天鹅安静地浮在水面。欣赏着如此宁静美丽的景色，大家结束了一天愉快的行程。我们每个人都收获颇丰，对于环境保护的教育，我们有义务身体力行。作为教育者，我们更加有责任将这些科学文化知识传播给下一代！我们期待春天有机会带着姊妹校的学生再来参观学习。