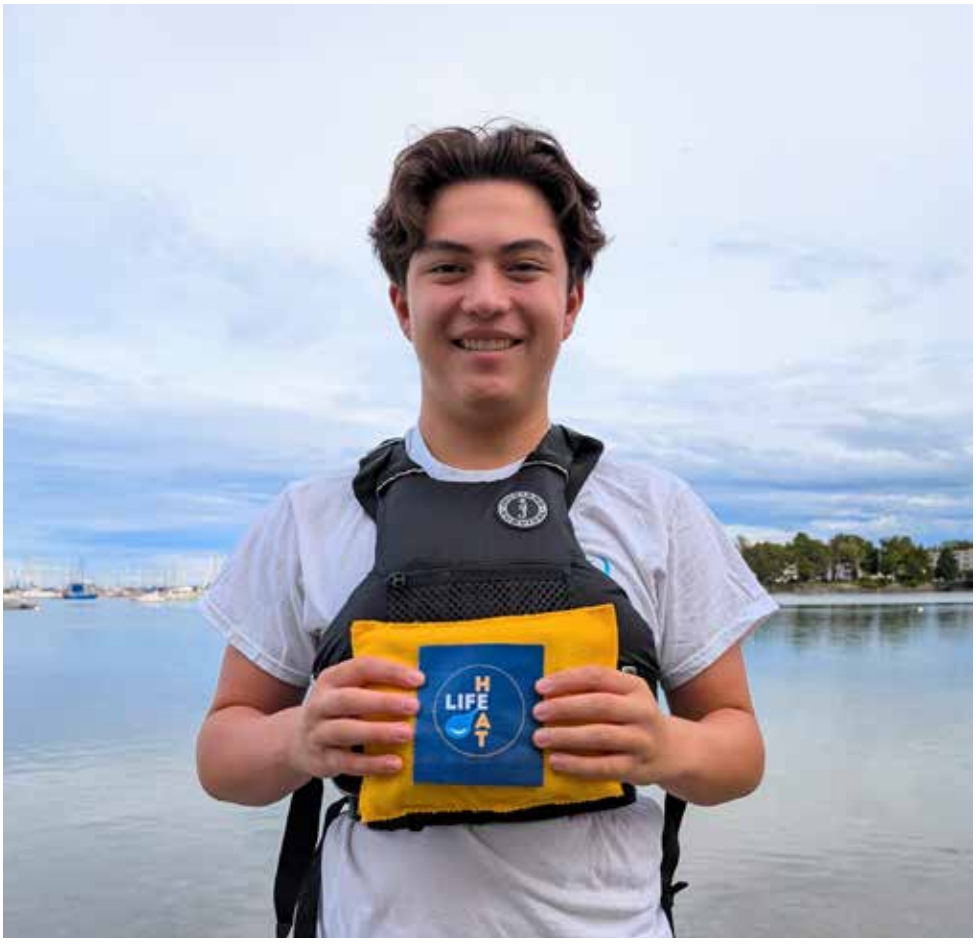


Liam Pope-Lau

Sailor, inventor, entrepreneur, prize winner, high school student

BY MARIANNE SCOTT

Five years ago, Liam Pope-Lau's 420 capsized in Cadboro Bay during Royal Victoria Yacht Club' sailing program. He was quite unprepared for the water's iciness and how it caused him to gasp. "Hyperventilating in water less than 10° C was so unexpected," Liam, accompanied by his mum, said during our meeting at RVYC. "I realized later I experienced cold water shock."

He began to discover more about this phenomenon, called a neurogenic cardio-respiratory response that triggers a deep breathing reflex that can lead to gasping, inhaling water and instant drowning. He also learned about hypothermia, how it slowly paralyzes the body and can also lead to drowning. He began pondering what could be done to increase the time one can survive cold-water immersion. "Knowing that keeping the core as warm as possible to stave off hypothermia, I started thinking about a device that might provide heat and activate when it hit water," he told me. "Something automatic requiring no pulling of cords or blowing up life jackets." He also wanted a survival pack that would work equally in fresh and salt water and fit any lifejacket. He looked for a chemical that might have the required properties and gave his future product a name: LifeHeat.

"It started as a science project in grade six at St. Michaels University School," he said. "I used calcium chloride to provide the heat. The chemical can have several concentration levels and is used in many processes, such as a de-icing agent on winter roads. In my first experiments, I put the chemical in a sock and submerged with it to calculate how much heat the reaction created. It turned out to be too hot and I had to jump out of the water." But the later proof-of-concepts worked: they had the right concentration of calcium chloride and he remained in the cold Oak Bay water for 45 minutes. After experimenting further, he added another ingredient, silica, to see if the heat would last longer. He suggests that LifeHeat can stave off hypothermia for up to 1.25 hours, although it may last longer if the heat calms the immersed person, stops frantic movements and thus conserves energy.

LIAM IS A confident teenager with a mop of dark curly hair. When I met him, he was just shy of 15 years-of-age and had already reached a height of six feet. An only child, he's used to conversing with adults, yet sweetly, still young enough to blush occasionally. He entered grade 10 in September.

The young inventor has had a drive for success from an early age. Supported by his BC-government director mum, Naomi Pope, and his management consultant dad, Gary Lau, Liam is well-spoken having enrolled in Speech Arts Victoria at age eight. This program teaches people of all ages how to communicate effectively, speak in public, recite Shakespeare and tell stories. Liam has benefitted from the program, not only helping him speak confidently and publicly about LifeHeat, but also at a performance at Carnegie Hall last fall after competing in the Greater Victoria Performing Arts Festival. He finished third in the provincials, which allowed him to enter the Magnum Opus International Speech and Drama Competition ▸

in New York City. He performed the Shakespeare scene where Mark Antony denounces Brutus and Cassius for participating in the plot to assassinate Julius Caesar.

His interest in drama has not deterred him from continuing to concentrate on developing and testing LifeHeat. The concept attracted attention early on and Liam has received a heap of awards. It seems the higher-level competitions offered deadlines and kept the teen working to meet them. Thus, the SMUS Science Fair project led to regional science fair recognition in 2022, including the Excellence Award for Engineering and Geoscience, the Dr. Zonk Award and the Rotary Club of Victoria Award.

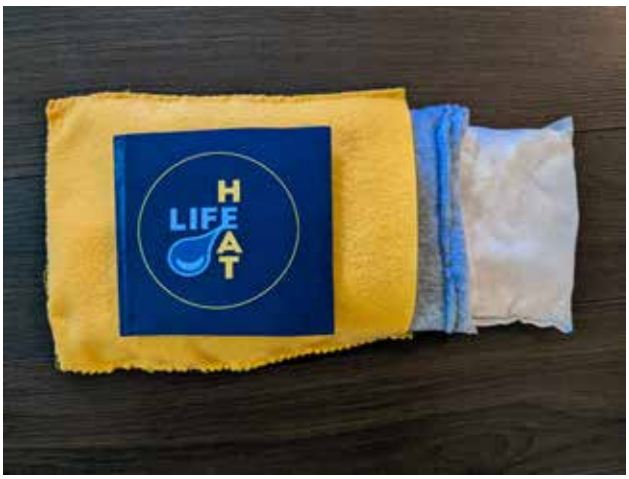
The Science Fair Foundation of BC issued three more awards to Liam, with the most significant being the 2022 BC Youth Innovation Showcase, in its "Innovator of the Year, age 12 to 15 Category." Liam was the prize co-winner and received $5,000 which, he said, was used for more experimentation.

He received further recognition in 2024 from the Ingenious+ National Innovation Challenge sponsored by the Rideau Hall Foundation for Technology and Entrepreneurship, winning a prize of $10,000 and a mentoring workshop. "While we were in Ottawa, the Executive Director of the League of Innovators, Melissa Allen, gave us a seminar on entrepreneurism," he said. "She covered such topics as how to set yourself up for success, pitch investors and found a company."

Liam's *pièce de résistance* award, however, was the prestigious 2024 Blue Ocean International Student Entrepreneur Competition which invites young people to submit a virtual pitch. The battle is fierce: 9,800 students from more than 1,700 schools across 161 countries and territories compete. Liam and LifeHeat won the first place, top-prize Global Award plus US $1,000. It must have been quite a pitch, of which we can see a sample at his YouTube channel.

Mustang Survival has also helped. "They gave me a tour of the Burnaby plant," he said. "I spoke with the engineers who helped me see next steps. I can even use their testing facility."

So where does he go from here? He continues to work on his product. Liam brought a sample of what LifeHeat looks like. "I had to learn to use a sewing machine," he said. "I experimented with various materials to improve heat preservation. Some of it is hard to sew as the material is quite bulky." At present, LifeHeat consists of three pouches made of recycled materials. The pouch holding the calcium chloride/silica is made up of a thin, nylon fabric, which is inserted into a sleeve of thick neoprene (think wet suit) on one side, and hefty fleece fabric on the other. The insulated pouch then fits into a felt envelope. The whole package measures 18 by 23 centimetres, weighs less than 200 grams and can easily be inserted into an inherently buoyant universal PFD. I can picture how LifeHeat can be especially useful inside a PFD for small children, paddleboarders and anyone inadvertently falling overboard.



Citing my favourite, non-bulky inflatable life jacket with its two straps running down my chest, I asked Liam, "Can your design be adapted to fit into the twin straps?"

"I'm working on that now," he said. He's also researching where he can source the materials needed to make multiple copies of LifeHeat. User testing, on paddleboarders for example, is in the offing. "That'll give me information on how the concept works in different conditions," he said.

Will he seek a patent? Start a manufacturing company? Sell the idea to an existing PFD company and earn royalties? "I'm still in the process of determining all that," he said. "I know my goal: to get LifeHeat out into the world. To save a life."

It's not all work and no play. Liam will spend a week on a SALTS sail-training schooner this fall. In his spare time, he's a youth ambassador for Victoria-based Ocean Diagnostics, an environmental company that tests for microplastics in the water and their origins. "We're citizen scientists," he said. "We tested in Cadboro Bay and found the highest concentration of microplastics near a storm drain. We also analyze the microplastics' weight and how currents move them."

HIS EARLY cold-water immersion hasn't kept him from sailing. He's a junior Royal Vic member competing in 420s. "Sailing can be whatever you want it to be," he said. "You can find yourself shooting across the water with a friend, foam coming up, feeling totally free. It's beautiful."