

# Hot invention cools down environment: Environmentally-friendly heat exchanger produced

February 15 2012

---

The current global energy crisis means that sustainability now supplants necessity as the mother of all invention. Concordia University's Georgios Vatistas, professor in the Department of Mechanical and Industrial Engineering, has taken this adage to heart with his reinvention of an industrial staple: the heat exchanger.

Used in large-scale commercial settings such as refrigeration systems, [power plants](#) and petroleum refineries, heat exchangers are massive machines that transfer heat from one medium to another in order to regulate the temperature of [industrial processes](#). Because of the massive scale, this heat transfer results in enormous energy demands and huge drains on environmental resources.

With the research portion of the project now complete, Vatistas has high hopes that his design will be met with enthusiastic industrial development. "Ultimately," he says, "this heat exchanger will have broad use across countless sectors. By responding to industrial needs with a more sustainable solution, we're showing that the future of engineering can be a green one."

The innovation behind Vatistas's unique design comes from over two decades of research into vortex flows. "Growing up in southern coastal Greece," recalls Vatistas, "I became familiar with the concept of [vortices](#) at an early age when my elders would warn me of the dangers of

swimming near whirlpools!" Youthful fascination evolved into research passion as Vatisas performed advanced theoretical work into how vortices alter the flow of fluid substances like air or water. He later went on to gain international renown for proving Nobel Prize winner J.J. Thomson's 125-year-old theorem on the stability of [vortex rings](#).

But it is on the practical side of things where Vatisas's work resonates loudest. When Vatisas realized that swirling flow could dramatically increase heat transfer exchange, the [commercial application](#) of his research quickly became evident. He then partnered with Gestion Valéo to investigate new designs of heat exchangers and received a prestigious "Idea to Innovation" grant from the Natural Sciences and Engineering Research Council in support of the work.

With the collaboration of PhD student and doctoral fellow Mohammed Fayed, Vatisas reengineered this widely used device to produce a prototype that is 40 times more efficient than the traditional model. This reinvention represents enormous energy savings, lower operating costs and far-reaching industrial implications.

Provided by Concordia University

Citation: Hot invention cools down environment: Environmentally-friendly heat exchanger produced (2012, February 15) retrieved 26 April 2024 from <https://phys.org/news/2012-02-hot-cools-environment-environmentally-friendly-exchanger.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.