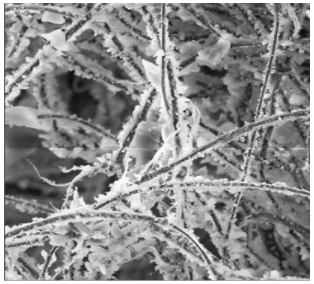
ENGAGED in the development of emerging green technology and environmentally friendly, sustainable energy conversion systems, LAEC researchers target critical challenges and model, design, fabricate, and experimentally evaluate prototype solutions.



LAEC

Laboratory for Alternative Energy Conversion

Principal investigator: Majid Bahrami, PhD, P. Eng., Associate Professor

Tier II Canada Research Chair in Alternative Energy Conversion Systems

School of Mechatronic Systems Engineering, Simon Fraser University

Tel.: +1 (778) 782-8538 **E-mail: mbahrami@sfu.ca**

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SFU

Selected Research Partners

alpha TECHNOLOGIES

COOL-IT
AUTOMOTIVE & INDUSTRIAL HVAC SPECIALIST

ANALYTIC SYSTEMS
Power Conversion Solutions

Saputo

Terrella
Energy Systems Ltd.

DEW POINT
manufacturing

GREENLIGHT INNOVATION

AUTOMOTIVE FUEL CELL COOPERATION

CrossChasm

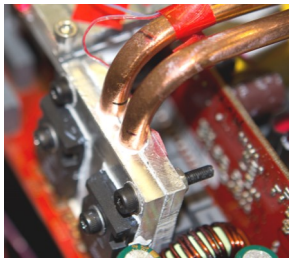
INNOVATION.CA
CANADA FOUNDATION FOR INNOVATION | FONDATION CANADIENNE POUR L'INNOVATION

NSERC
CRSNG

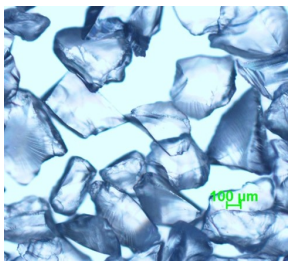
LAEC

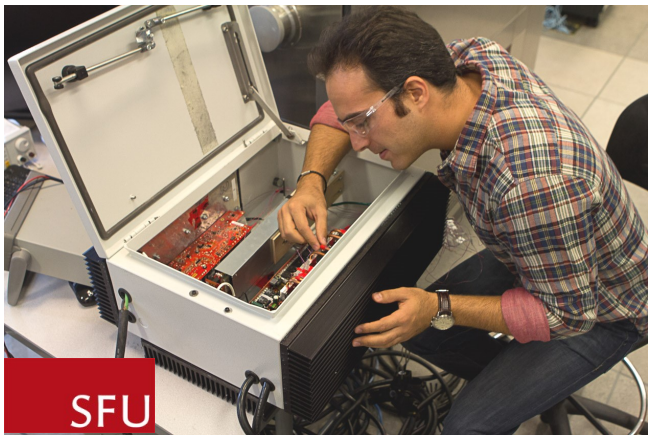
Laboratory for Alternative Energy Conversion

The **Laboratory for Alternative Energy Conversion** seeks to improve energy conversion efficiency in devices such as compact heat exchangers, fuel cells, batteries, and refrigeration systems, by addressing fundamental problems at multiscale levels.

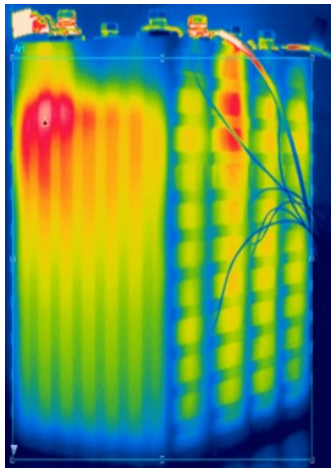


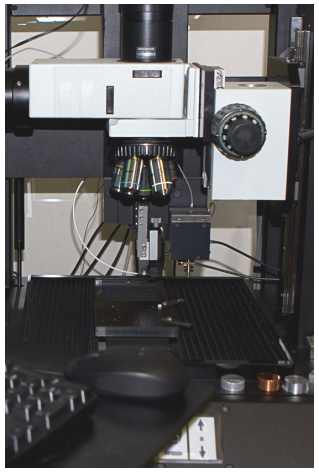
The LAEC's diverse research group collaborates with industrial partners to develop emerging technology through modeling and laboratory testing supported by Automotive Partnership Canada, the Canadian Foundation for Innovation and NSERC.

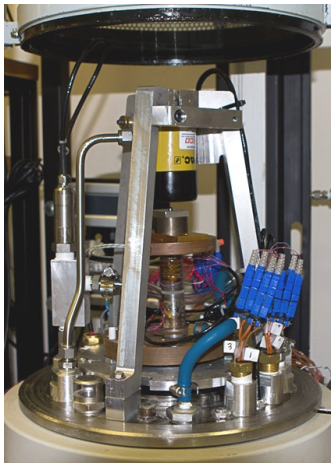


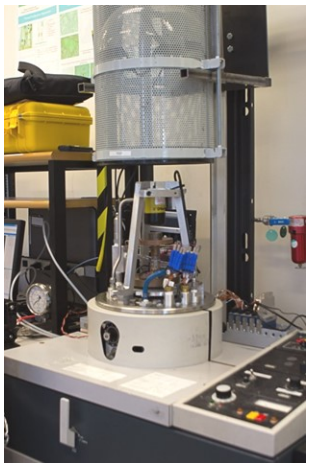


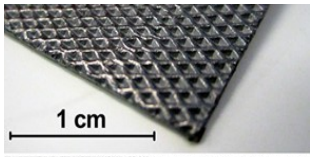
SFU

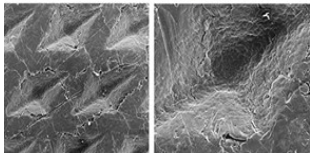












GREEN COOLING TECHNOLOGY

LAEC has invested in leading edge technology to develop sustainable cooling systems:

- Passive cooling systems for power electronics.
- No-idle battery powered air conditioning and refrigeration systems for service vehicles.
- Adsorption cooling systems utilizing waste heat.
- Graphite heat exchangers.
- Measuring and modeling transport phenomena in micro-structured materials.

FACILITIES

Environmental chambers (capacity: 32 cu ft to 104 cu ft)

HVAC lab and field test systems **(ASHRAE 16-1983, ANSI/AHRI 210-240)**

Battery power cycling system (drive cycle simulations)

Large–scale calorimeter

Microchannel flow visualization

Thermogravimetric vapor sorption analyzer

Wind tunnel (1.5—1200 cfm)

Guarded heat-flow thermal conductivity and contact resistance test bed **(ASTM C177, ASTM D5470)**

Heat flow meter insulation testing (**ASTM C518**)

Transient plane source “hot disk” thermal constants analyzer (range: 0.005 to 1800 W/(m·K), **ISO/DIS 22007-2.2**)

Micro- and nano-indentation **(Vickers hardness, ASTM E92 & E384)**

Electroforce mechanical analyzer with compression, flexure, tensile and dynamic test modes up to 3 kN

Infrared imaging and analysis

THERMAL MANAGEMENT

Our research group has expertise in emerging thermal management technology for a range of uses, from alternative energy vehicles to batteries and building applications:

- Balancing the needs of multiple systems in hybrid electric vehicles through integrated thermal management.
- Designing new heating, ventilation, air conditioning and refrigeration systems for vehicle and building applications.
- Thermal management batteries for safe and efficient operation.