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CANMET-MTL Academic User Access Facility

Making pilot-scale materials research affordable for Canadian universities

A joint initiative of Natural Resources Canada, the Natural Sciences and Engineering Research Council of Canada, and McMaster University

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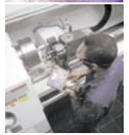
innovation research collaboration opportunities



An innovative university-government research collaboration

The Academic User Access Facility (AUAF) is an initiative that enables researchers from Canadian universities to access designated areas of the pilot-scale processing facilities at the CANMET Materials Technology Laboratory (CANMET-MTL) in Ottawa.

The AUAF is the result of a Major Facilities Access Agreement among the Natural Sciences and Engineering Research Council of Canada (NSERC), McMaster University, and Natural Resources Canada (NRCan). It provides a novel platform for collaboration between university academics and government researchers that will greatly facilitate innovation in materials research and technology.

The AUAF is managed by a Research Management Committee chaired by Dr. David Wilkinson, Principal Investigator and Professor, Department of Materials Science and Engineering, McMaster University. NSERC has awarded funding of $795 000 over the three-year period that began in the fall of 2003 and, combined with the contribution from NRCan and user fees, the total available AUAF project portfolio is valued at $2.65 million.

Who can participate?

Researchers and graduate students in the Canadian academic community from several different disciplines will be interested in this opportunity, particularly those involved with:

- Primary metal production
- Cast and formed metal products
- Concrete and other construction materials
- Materials that are strategically designed to meet special needs (for example, composites)

Scaling up from the laboratory

To bring research results closer to commercialization, pilot-scale facilities are often needed to properly validate laboratory findings and to identify additional problems that need to be addressed. The AUAF provides university researchers with an opportunity to fabricate and test large samples and prototype components. It also provides new insights into factors affecting scale-up that are essential to the successful transfer of technology.

A unique materials processing facility

CANMET-MTL has facilities for metals-based materials production and performance assessment that are unique in Canada and, in terms of scale and comprehensiveness within one centre, that are also unique internationally:

- The largest experimental casting laboratory in the country
- An extensive metal-forming laboratory, including a pilot-scale rolling mill and facilities to simulate stamping, forging, extruding and other processes
- Welding and joining facilities, and full-scale mechanical testing machines to evaluate fatigue, strength, and the impact properties of metals
- An extensive laboratory for the production and evaluation of concrete
- Advanced materials production capability, including metal-matrix composites, metal powder injection moulding, and ceramic materials processing, as well as computer-controlled electrical, electromechanical, thermal and morphological characterization facilities
- The most extensive and diverse corrosion research facilities in the country
- An integrated on-site shop for machining, carpentry, and electrical work to support prototype development and pilot-scale activity

Unparalleled opportunities for graduate students

The AUAF also offers an unprecedented learning opportunity for graduate students since training and hands-on participation are an integral part of the initiative. Students have the opportunity to become actively involved in the design of experiments, the development and placement of instrumentation and sensors, the conduct of experiments, and the interpretation of results. Additionally, they will have access to the services and expertise of more than 120 scientific, engineering, and technical staff.

Peer review selection

Participating in this initiative begins with the submission of an application for research. Proposals for access to the AUAF should be made in one of the four Theme Areas overseen by the corresponding theme leader listed below:

Steel	Dr. Steven Yue, McGill University
Lightweight Metals	Dr. Mihriban Pekguleryuz, McGill University
Concrete	Dr. Mohamed Lachemi, Ryerson University
Emerging and Composite Materials	Dr. Hani Henein, University of Alberta

Upon receipt your application will be reviewed by the theme leader, who will select reviewers for the proposal. Each proposal will be judged on its scientific merit, technical feasibility, and the appropriateness of the scope of the requested access. There is no predetermined limit on the size (dollar value) or duration (from a few hours to three years) of a project.

Affordable for universities

Access to the materials processing facilities at CANMET-MTL is made affordable by the AUAF since NRCan contributes about 55% of the cost of the research project while the grant awarded by NSERC provides up to 30% of the cost. The university community benefits from access to pilot-scale facilities at rates that are comparable ($30/hr.) with what researchers pay to support facilities at Canadian universities.

For every research dollar contributed by a university in user fees, the university in turn receives six dollars' worth of research services.

Additionally, NRCan will, on a limited case-by-case basis, assist students with the costs of travelling between their universities and CANMET-MTL. Students must be enrolled in Canadian universities and be part of an approved AUAF joint research project.

For more information

To learn more about the Academic User Access Facility or to submit an application, visit the AUAF web site at **www.auaf.nrcan.gc.ca**.

You may also contact the AUAF Administrator in any of the following ways:

E-mail: auaf@nrcan.gc.ca

Telephone (*toll-free within Canada*): 1-866-665-6623

Fax: 1-613-992-8735

Postal mail:
Attention: AUAF Administrator
Academic User Access Facility
CANMET Materials Technology Laboratory
Minerals and Metals Sector
Natural Resources Canada
568 Booth Street
Ottawa, ON K1A 0G1



THE AUAF: Building on a tradition of technical achievements

1940s

The CANMET Materials Technology Laboratory, a division of the Minerals and Metals Sector of Natural Resources Canada, has been in operation and serving the academic and industrial communities since 1942. Among CANMET-MTL's principal accomplishments:

At the beginning of World War II, the service life of the tracks on tanks was 500 miles. Following an extensive metallurgical research program, the service life of tank tracks was extended tenfold to 5000 miles.

1950s

Desulphurization of steel accomplished by injection of lime and aluminum-magnesium alloy beneath the surface of the molten metal.

A 10-15% increase in Canada's steel-melting capacity was projected; the successful technique was adopted as standard industrial practice.

1960s

To address cracking near welds in structural steels, CANMET-MTL researchers develop a formula, now used internationally, to determine the heat-pretreatments necessary to avoid cracking after welding.

1970s

CANMET-MTL scientists used X-ray studies of the flow of molten metal to design and optimize the gating system in sand-mould casting. The technique has since become standard foundry practice.

1980s

A transportable X-ray stress diffractometer for measuring stress in metallic structures is developed.

Ultrasonic, piezo-electric, and solid-electrolyte materials for use in sensors and actuators are developed. These electronic devices generate small electrical currents in response to pressure changes from ultrasound waves and have several applications, including medical diagnostics, fire alarms, and defence applications.

Toughness requirements and fatigue design data are established for steel and steel-concrete composite fixed offshore oil and gas rigs such as Hibernia. These data have since been incorporated into a National Standard of Canada and referenced in legislation.

CANMET-MTL researchers develop a system to cast in thin strips a lead-antimony alloy for batteries. Machines for this purpose are now being sold worldwide.

1990s

The bridge connecting Prince Edward Island to New Brunswick is the first prominent structure in Canada to use high-volume fly ash concrete (HVFAC), originally developed by CANMET-MTL. The manufacture of HVFAC reduces the greenhouse gas emissions produced in conventional concrete production.

To reduce lead levels in drinking water, CANMET-MTL researchers developed three lead-free alloys (now known as EnviroBrass) to be used in residential and commercial plumbing applications.

2000s

CANMET-MTL scientists develop pilot-scale tube-making capabilities for hydroforming of aluminum and high-strength steel. This significant advance broadens the Canadian capability for research on hydroforming and pilot-scale production of advanced tubes for automotive applications.

CANMET-MTL scientists develop and patent a biosensor to detect microbiologically influenced corrosion, an important form of corrosion on Canada's oil and gas pipeline system.