CELEBRATE KINGS: *Pride in our people, places and products*

Mapping new roads in science - from the atom up!

Imagine working with particles so small the human eye cannot see them! It's happening in laboratories beneath Acadia University's Huggins Science Hall, where scientists work with the tiniest of materials in amazing cutting-edge research!

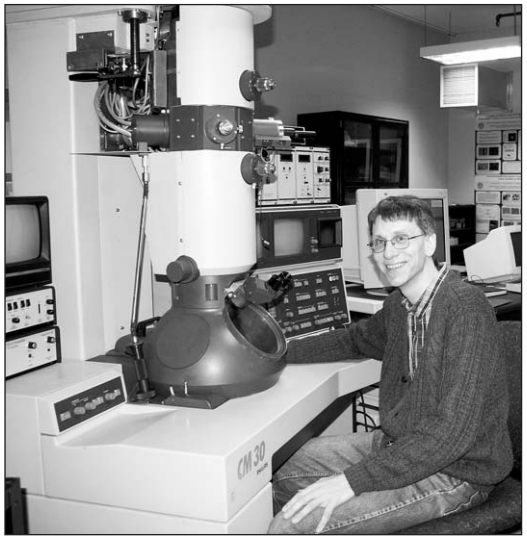
In Wolfville, Kings County, at the Acadia Centre for Microstructural Analysis (ACMA), Dr. Craig Bennett and fellow researchers spend countless hours outside the classroom studying the minutest of materials – atoms – to achieve varying research goals.

"There are people working on drug synthesis – synthesizing new compounds which may be better able to battle tumors," says Craig, an Acadia physics professor and director of ACMA. "Others are biologists studying how certain plants could clean contaminated soil to rehabilitate the environment, or researching how the reproductive biology of small marine worms may impact the Bay of Fundy ecology."

First set up in 2000, ACMA is considered a central research facility in the physical sciences. It assists the studies of 20 research scientists from the physics, chemistry and biology departments, and 20 to 30 students annually.

Last fall, the ability to better accomplish their research goals was significantly boosted when the Canada Foundation for Innovation invested over $407,000 in ACMA.

"The funding is meant to upgrade ACMA to help it maintain its reputation of producing leading-edge scientific research," says Craig, "It will help us maintain the facility at a state-of-the-art level."



Dr. Craig Bennett with a transmission electron microscope.

The ACMA laboratories house instruments such as a transmission electron microscope, which allows researchers to examine the structure matter at an amazingly small level – at the size of a nanometer or one-billionth of a meter.

"The instruments we use help us to understand the properties of the materials we work with, and with that understanding, we can improve their properties," says Craig. "Some materials are not optimum for what you want to accomplish. For example, if you need a material to become less brittle and withstand extreme temperatures, then you need to adjust the atomic arrangements to accomplish this."

In their physics research, Craig and his fellow researchers work with metals called ferromagnetic shape memory alloys, which hold promise for the development of future "smart" materials. If larger, high-quality crystals of these alloys (a combination of nickel, manganese, and gallium) can be produced, they have great potential for a wide range of applications including sonar, magnetic field sensors, and electrical power generation.

"A sensor deep in the ocean needs power," says Craig. "But you can't easily change or charge a battery deep below the surface. The materials we are working with can be used to convert small vibrations from ocean currents into an electrical voltage and act as a battery charger."

These same crystals also absorb energy. If used around a helicopter rotor, the vibrations would not carry into the aircraft. At the same time, because the vibrations generate a magnetic field, energy can be harvested from them.

"This technology has a potentially large market. The main body of work in this area has been carried out in the last five years. And it will really begin to grow over the next decade!"

It's leading-edge research, putting Acadia University – and Kings County – on the world map of science!