

## ACSES Official Opening, Feb. 01, 2005



## ExpressNews

### Engineering unveils \$13-million surface research centre

By Geoff McMaster



Dr. Murray Gray

February 1, 2005 – Great thinkers from Plato to Einstein have urged inquiring minds to look beneath the surface of things to find their true essence, but to many of today's scientists, the surface is where all the action is.

That's why the University of Alberta's Faculty of Engineering established the \$13-million Alberta Centre for Surface Engineering and Science (ACSES) to better understand that all-important, dynamic first layer of molecules on materials as diverse as microelectronics, medical implants, pharmaceuticals and oil sands. The centre is one of the best of its kind in North America.

"I hate to contradict Plato," said Dr. Murray Gray, the centre's director, at its official opening Tuesday, "but I think what we know now is that many of the properties of materials that are so

important depend on the (optical, chemical and biological) characteristics of those few atoms and molecules right at the surface.”

One example of research that exploits the properties of surface particles is a fast-healing burn dressing used on victims of the World Trade Center tragedy, designed by Canada Research Chair Dr. Robert Burrell, a professor of chemical and materials engineering. Silver particles on the surface of the dressing kill bacteria and speed healing without the need for drugs. The dressing is now used in burn units around the world and is considered one of most significant advances in wound-care history.

“Dr. Burrell and his team have used the facilities of ACSES to really get in and understand some of the reasons why those dressings are so effective... and to build on that knowledge to lead toward the new generation of biomedical materials,” said Gray.

In the Department of Chemistry, Dr. Jillian Buriak and her team are working on patterning metal particles into structures resembling Inuit Inukshuks. The hope is that, placed on conductor surfaces, they will form part of new devices that integrate conductors with nano-wires and biological components. Using ACSES equipment, the researchers were able to determine the chemical properties of these tiny Inukshuk-like structures.

Gray said his own research group has been looking at ways to reduce waste – called coke – produced in oil sands extraction. Using instruments at ACSES, Gray aims to understand better how coke is formed in the extraction process. “If we can reduce coke yield by even one per cent, the yield over the rest of the life of Syncrude amounts to tens of billions of dollars,” said Gray.

In the “rapidly developing field of nanotechnology,” said Gray, scientists are learning to manipulate matter, and build devices, at scales of less than a millionth of a metre. “An important part of nanotechnology research is not only building those micro or nano-devices, but being able to analyse what you’ve actually achieved, and this is where ACSES plays a critical role.”

ACSES has recently acquired some new equipment that has put it on the map in the area of surface analysis. Its scanning auger microscope, for example, the only one in North America, cost about \$1.5 million. With the addition of two state-of-the art auger microscopes, a spectrometer and sample preparation equipment, the centre is unique in Western Canada and one of the finest on the continent, said Gray. Temporarily housed in the Chemical and Materials Engineering Building, it will move next fall to the new Canadian Centre for Interdisciplinary Sciences.

“This centre builds upon established and recognized areas of excellence, not only in the faculties of engineering and science, but in the broader University of Alberta context,” said Dean of Science Gregory Taylor. He said the centre demonstrates science is no longer about scientists working alone in silos in a single discipline. “We see teams coming together, bringing their expertise from across traditional boundaries.”

He added that it is important not to underestimate the impact of a research centre like ACSES on the quality of teaching.

Funding for ACSES came from the Canadian Foundation for Innovation, the Government of Alberta

through the Alberta Science and Research Investments Program, Syncrude and Micralyne. The faculties of engineering and science made in-kind contributions.

Engineering dean David Lynch said the new centre will also play a key role in attracting some of the world's finest scientists. "Truly those tiny components that Dr. Buriak is working on do point the way forward for us, in the same way they do in the North in their very large form," he said.